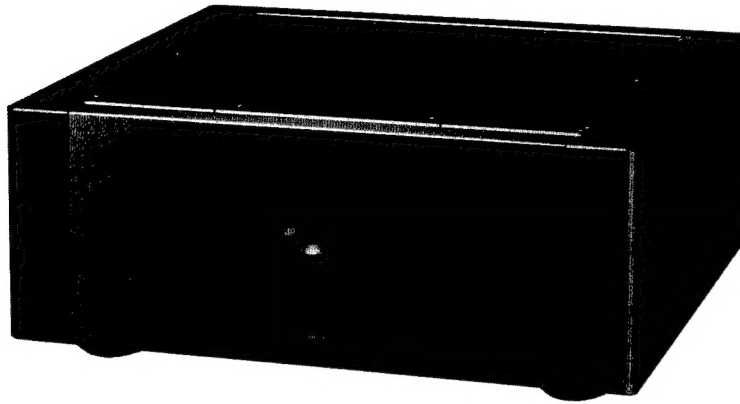


TA-NR1

SERVICE MANUAL

US Model
Germany Model



SPECIFICATIONS

Amplifier section

Type	Pure A-class monaural power amplifier
Circuitry	Complementary Darlington SEPP with all stages directly coupled
Power bandwidth (IHF)	5 Hz – 50 kHz (50 W output, 8 ohms, 0.1% THD)
Overall output (20 Hz – 20 kHz)	200 W (4-ohm load, 0.08% THD) 100 W (8-ohm load, 0.05% THD)
Frequency response	5 Hz – 100 kHz ± 3 dB
Input sensitivity	UNBALANCED: 1.1 V (47 kohms) BALANCED: 1.1 V (600 ohms)
Damping factor	50 (8 ohms, 1 kHz)
Residual noise	Less than 30 μ V
Signal-to-noise ratio	120 dB
Outputs	SPEAKER terminals Accepts speakers of 4 – 16 ohms.

General

Power requirements	1 20 V AC, 60 Hz (US model) 220 – 230 V AC, 50/60 Hz (Germany model)
Power consumption	300 W
Dimensions	Approx. 466 x 188 x 462 mm (w/h/d) (18 $\frac{3}{8}$ x 7 $\frac{1}{2}$ x 18 $\frac{1}{4}$ inches)
Weight	Approx. 47.5 kg (104 lb 12 oz.)

Design and specifications subject to change without notice.



MONAURAL POWER AMPLIFIER
SONY®

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SERVICING NOTE

1. For protection against scratching in the time of repair and maintenance inspection be sure to lay protective materials, such as a protection sheet, under the set.
2. Do not check the input transformer T1 for continuity. (If checked, the core will magnetized, deteriorating the sound quality.)
3. This set uses select component parts. For replacement of any part, a new genuine part must be used.
4. To prevent a secondary failure, the check of the drive stage, etc. should be made after the final stage has been removed.
5. When a stranded signal-core wire was removed for repair, it must be again wired as before the repair.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ OR DOTTED LINE WITH MARK Δ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

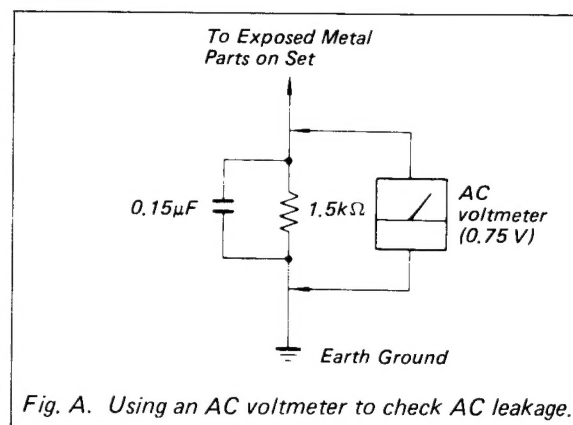


Fig. A. Using an AC voltmeter to check AC leakage.

SECTION 1 GENERAL

1-1. LOCATION OF CONTROLS

This section is extracted from instruction manual.

Front Panel

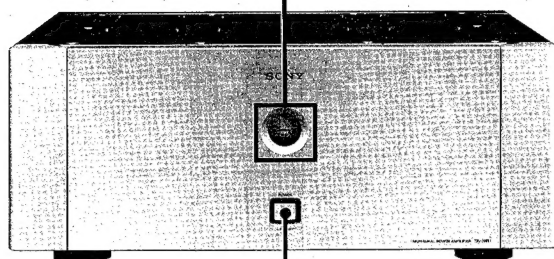
Display window

Protection indicator: Lights red when the POWER switch is turned ON and stays red for approximately 15 seconds. The red light indicates that the protection circuit is activated. The indicator lights green when the protection circuit is canceled and the amplifier is ready to operate. If the indicator changes from green to red while the unit is operating, the unit has encountered an abnormality and has activated the protection circuit. (When the protection circuit is activated, no sound is output to the speaker.) If this occurs, check to see if the SPEAKER terminals are short-circuited or if a DC voltage is being applied to the INPUT terminal.

Temperature indicator: Indicates the internal temperature of the amplifier. Check the internal temperature to drive the amplifier in a good condition.

When the needle is in the C range: The amplifier's internal temperature is within the proper range.

When the needle is in the H range: The amplifier's internal temperature has exceeded the proper range. This occurs when the amplifier is used for a long period of time under severe operating conditions. If this happens, you should let the amplifier cool down by turning the power off for a while or moving it to a location which is better ventilated.



POWER switch

Rear Panel

UNBALANCED INPUT terminal

When making a monaural connection, connect this input terminal to your preamplifier's output terminal.

BALANCED Cannon XLR connector input terminal

When making a balanced connection using Cannon XLR connectors, connect this input terminal to your preamplifier's output terminal.

- 1 GROUND
- 2 HOT (+)
- 3 COLD (-)



HOT (+) INPUT terminal

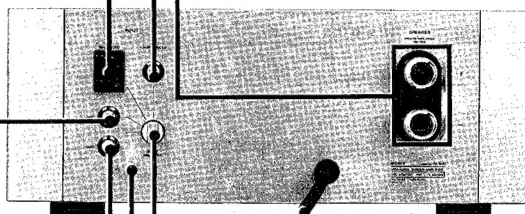
Use this terminal when making a bridge connection where two amplifiers are used for each channel. Set the INPUT SELECTOR switch to HOT. (See page 7.)

COLD (-) INPUT terminal

Use this terminal when making a bridge connection where two amplifiers are used for each channel. Set the INPUT SELECTOR switch to COLD. (See page 7.)

SPEAKER terminals

These are screw-type terminals for ensuring positive speaker cord connections. Speaker cords with core wire diameters of up to 12 mm can be used. It is recommended to select a speaker with an allowable input rating large enough to handle the effective output power of the amplifier. Use a speaker with an impedance of 4 – 16 ohms when the amplifier is used as a normal monaural amplifier, and use a speaker with an impedance of 8 – 16 ohms when the amplifier is used in a bridge connection.



Power cord

INPUT SELECTOR switch

Set to the position corresponding to the input terminal connection.

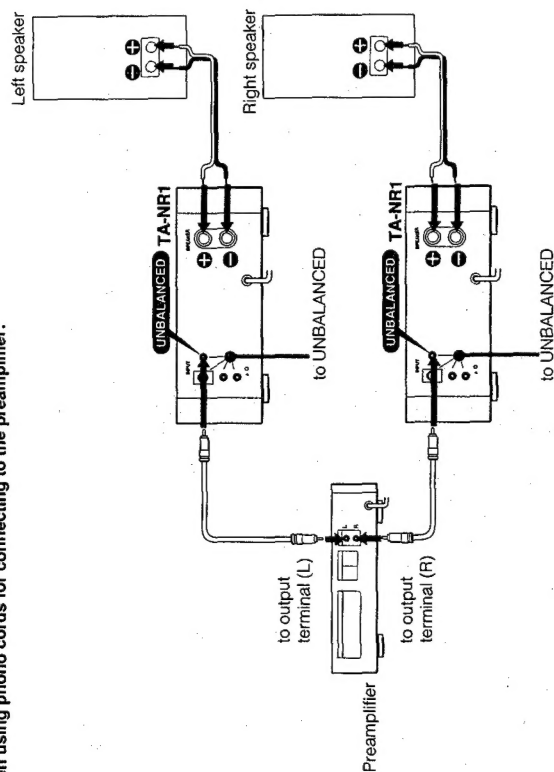
Ground terminal (⏏)

Connect a ground wire to this terminal.

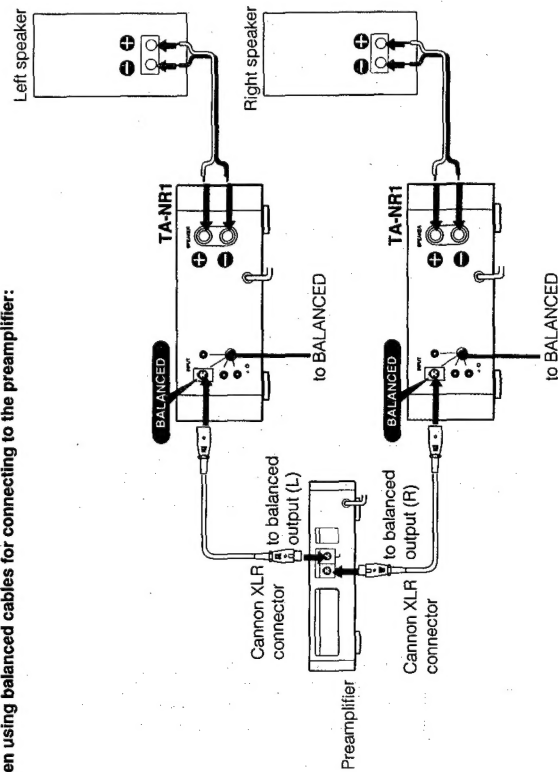
1-2. CONNECTIONS

Monaural amplifier connection

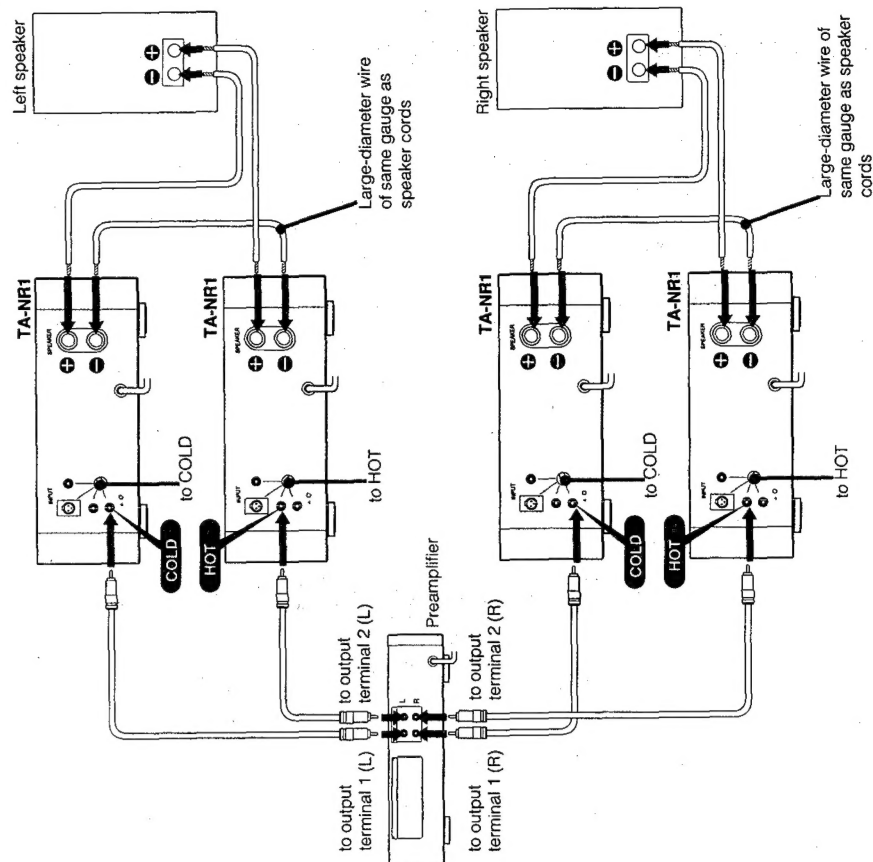
When using phono cords for connecting to the preamplifier:



When using balanced cables for connecting to the preamplifier:



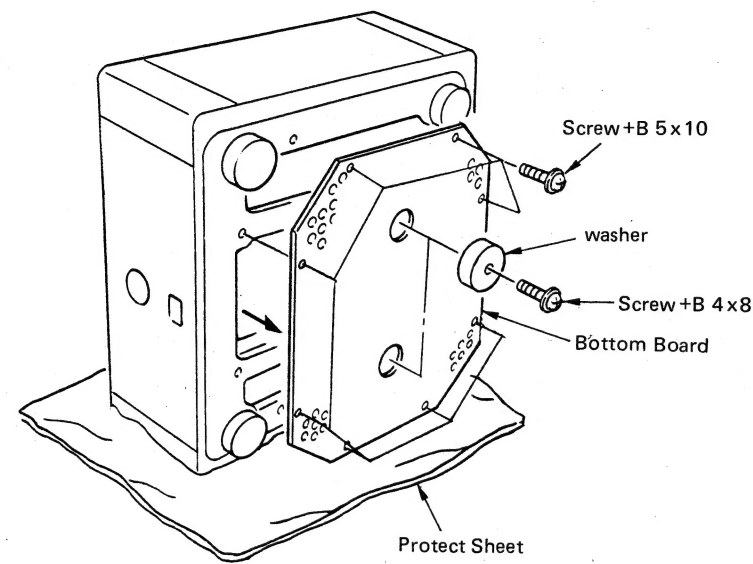
Bridge connection using two amplifiers for each channel



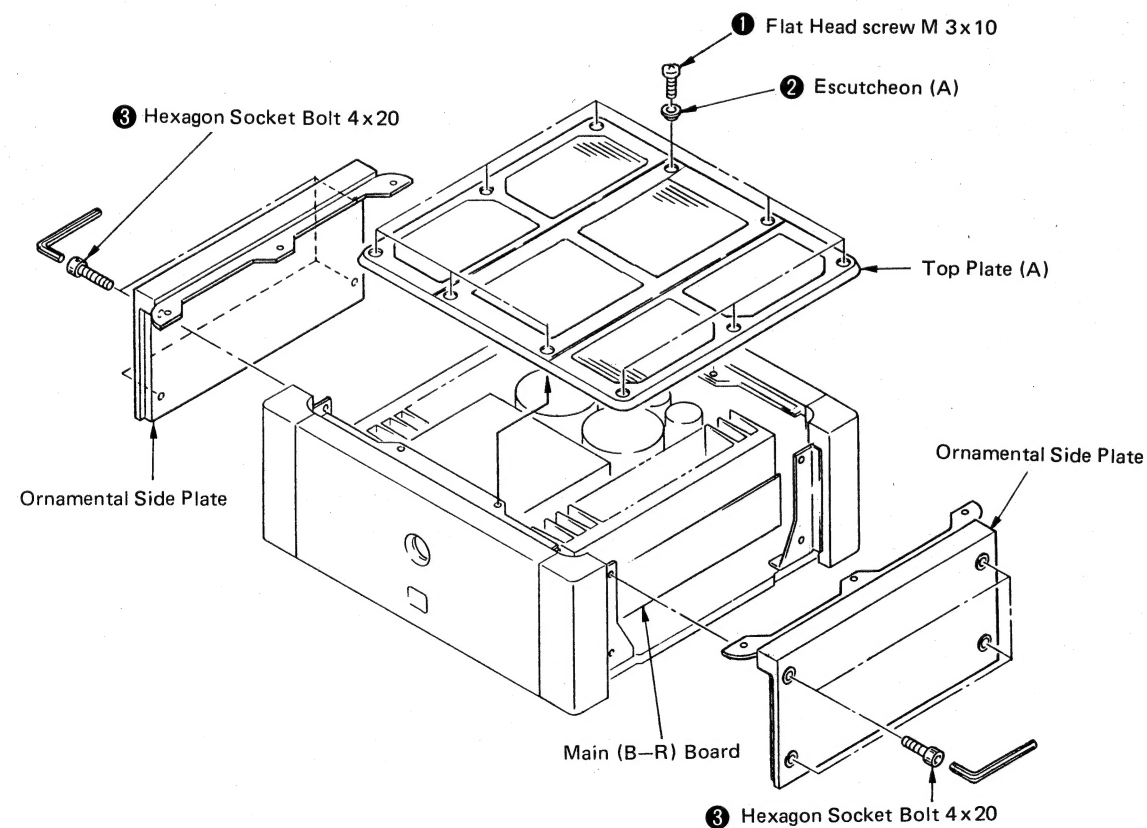
SECTION 2 DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

[PS BOARD, FUSE BOARD]

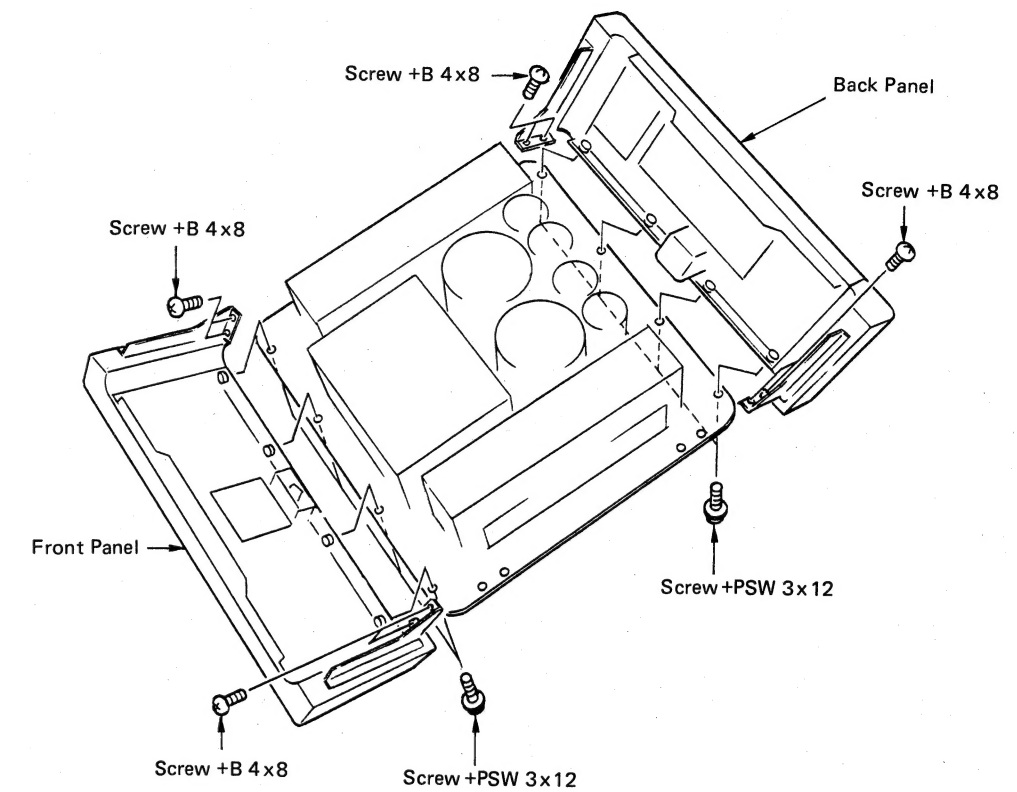


[MAIN (B-L)/(B-R) BOARD, IC BOARD]



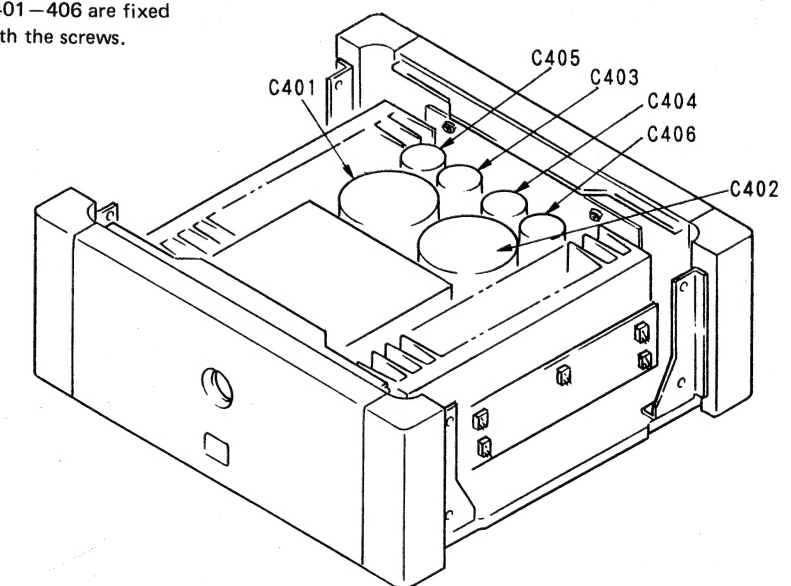
[FRONT PANEL SIDE: DRIVE BOARD, LED (L)/(R) BOARD, METER]

[BACK PANEL SIDE: MAIN (A) BOARD, SP.TM BOARD]



[LOCATION OF ELECTRICAL CAPACITOR (PS BOARD)]

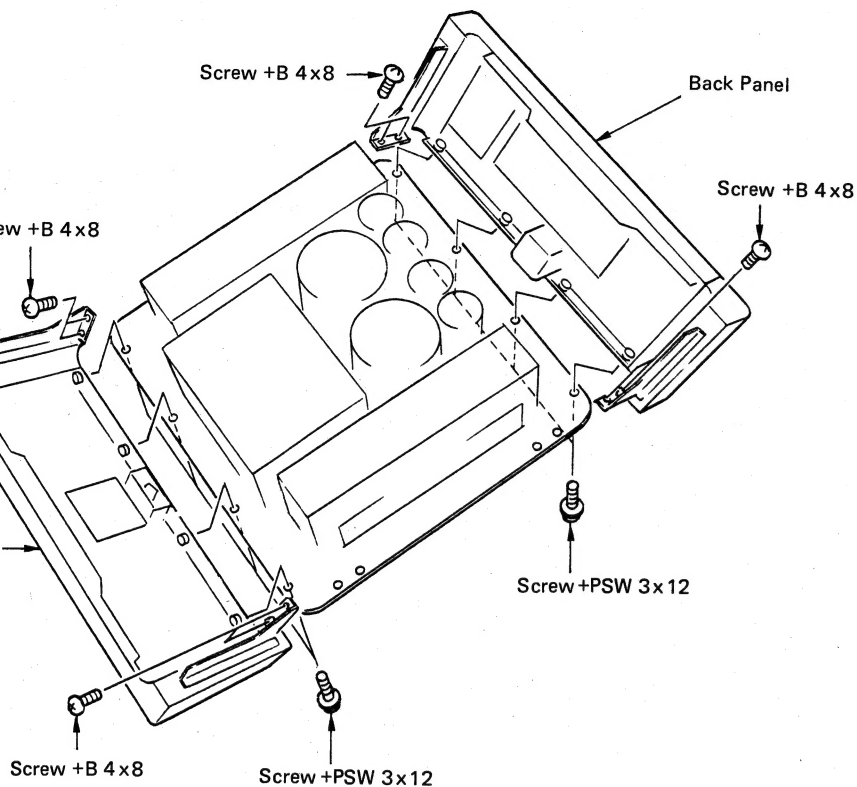
C401—406 are fixed with the screws.



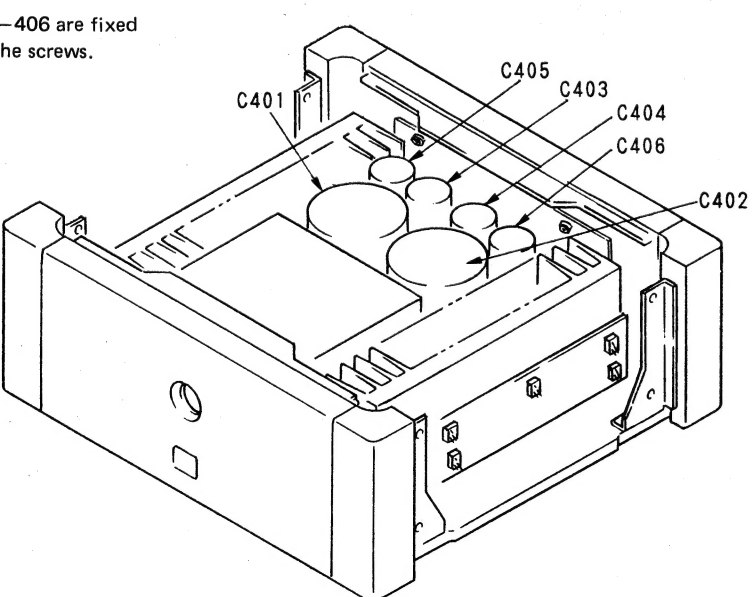
SECTION 3 ELECTRICAL ADJUSTMENTS

EL SIDE: DRIVE BOARD, LED (L)/(R) BOARD, METER]

L SIDE: MAIN (A) BOARD, SP.TM BOARD]



N OF ELECTRICAL CAPACITOR (PS BOARD)]



• Precautions for adjustment.

- Before starting the adjustment, keep the unit powered for about 10 minutes under the conditions of no load and no signal.
- In the process of adjustment, heat dissipation should be taken into account with caution to protect the unit from direct wind blows. If not, the measurements may fluctuate.
- This adjustment must be made after such a major component as the final-stage transistor is replaced.

[IDLING CURRENT ADJUSTMENT]

Procedure:

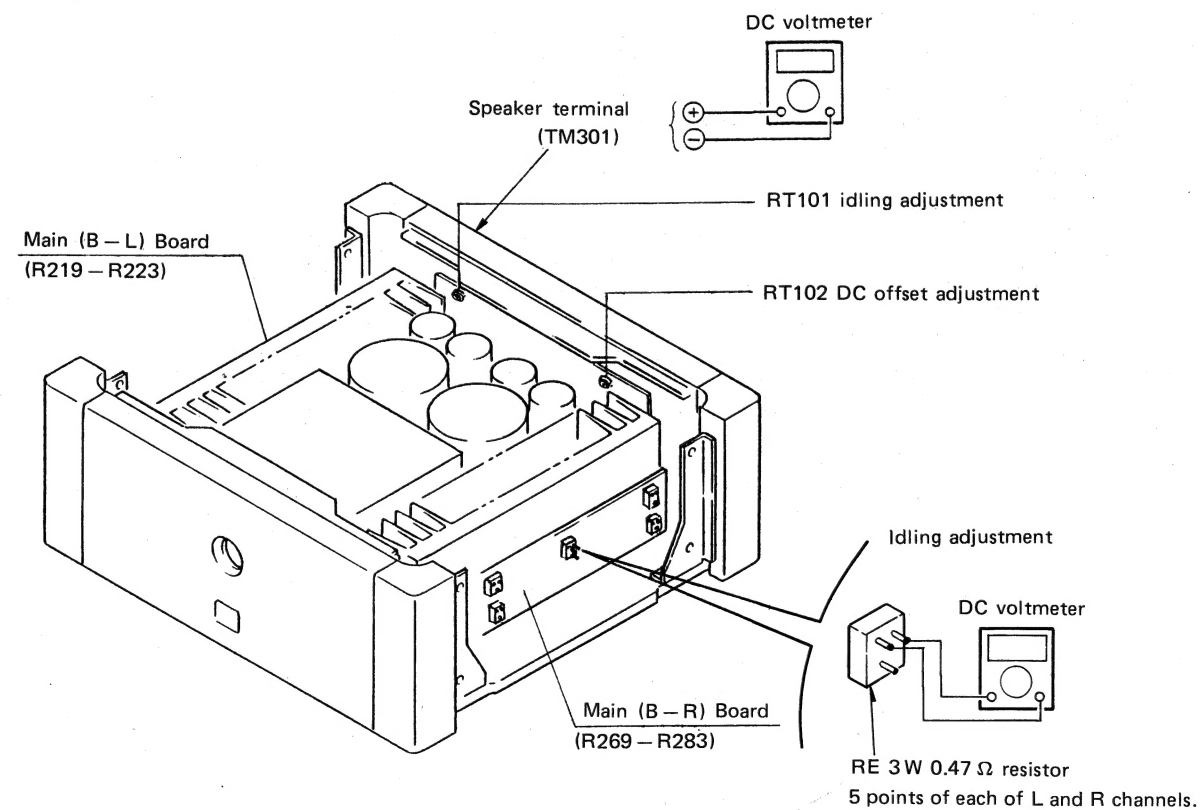
1. Connect a DC voltmeter (digital voltmeter) to respective leads of R219 to R223 and R269 to R273, and measure the voltage across each resistor.
2. Adjust RT101 so that the average of voltages at the above 10 places will be 0.15 V (± 0.02 V).

[DC OFFSET ADJUSTMENT]

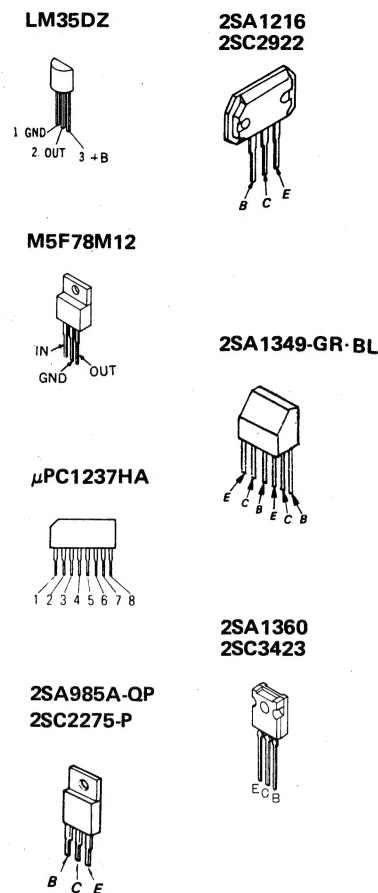
Procedure:

1. Connect the DC voltmeter to both terminals of the SP terminal (TM301), and adjust RT102 so that the indication of the DC voltmeter will become 0V.

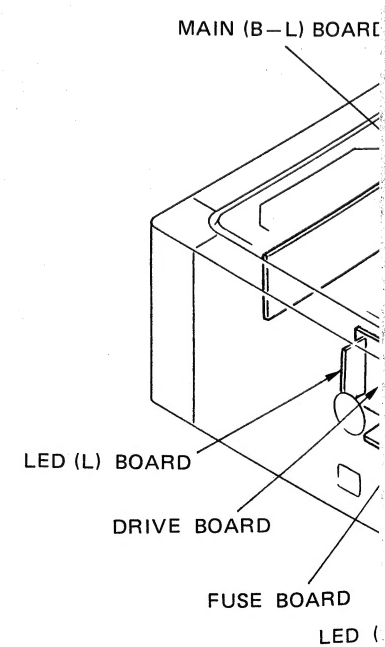
Adjustment positions:



4-1. SEMICONDUCTOR LEAD LAYOUTS

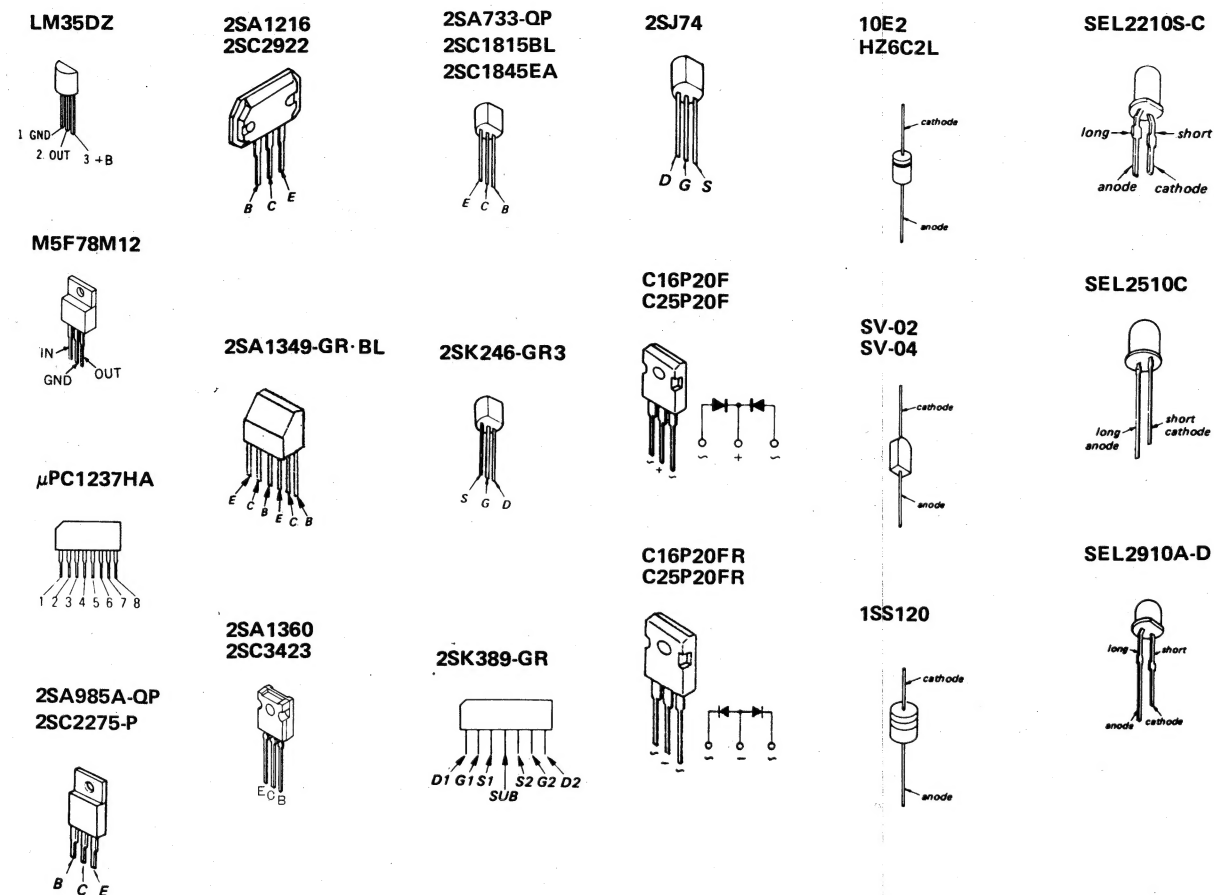


4-2. CIRCUIT BOARDS LOCATION

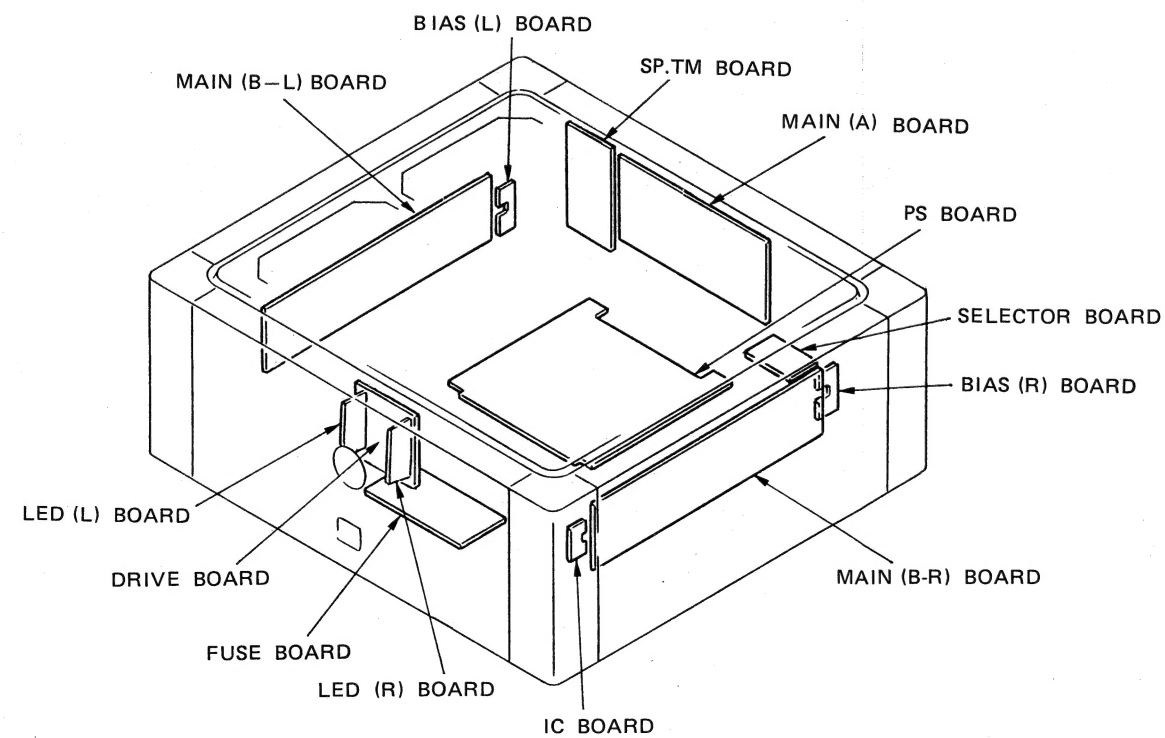


SECTION 4 DIAGRAMS

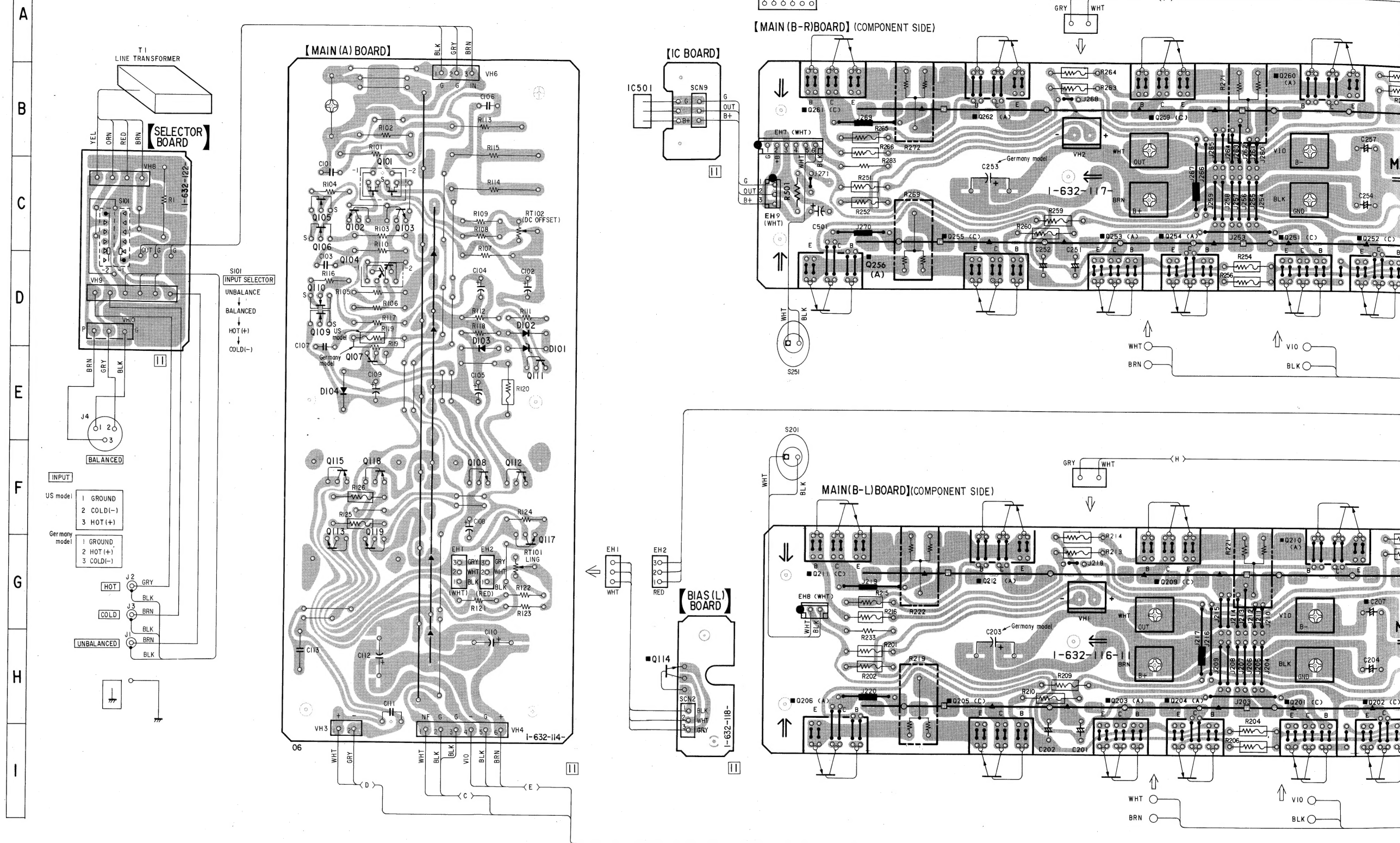
4-1. SEMICONDUCTOR LEAD LAYOUTS



4-2. CIRCUIT BOARDS LOCATION



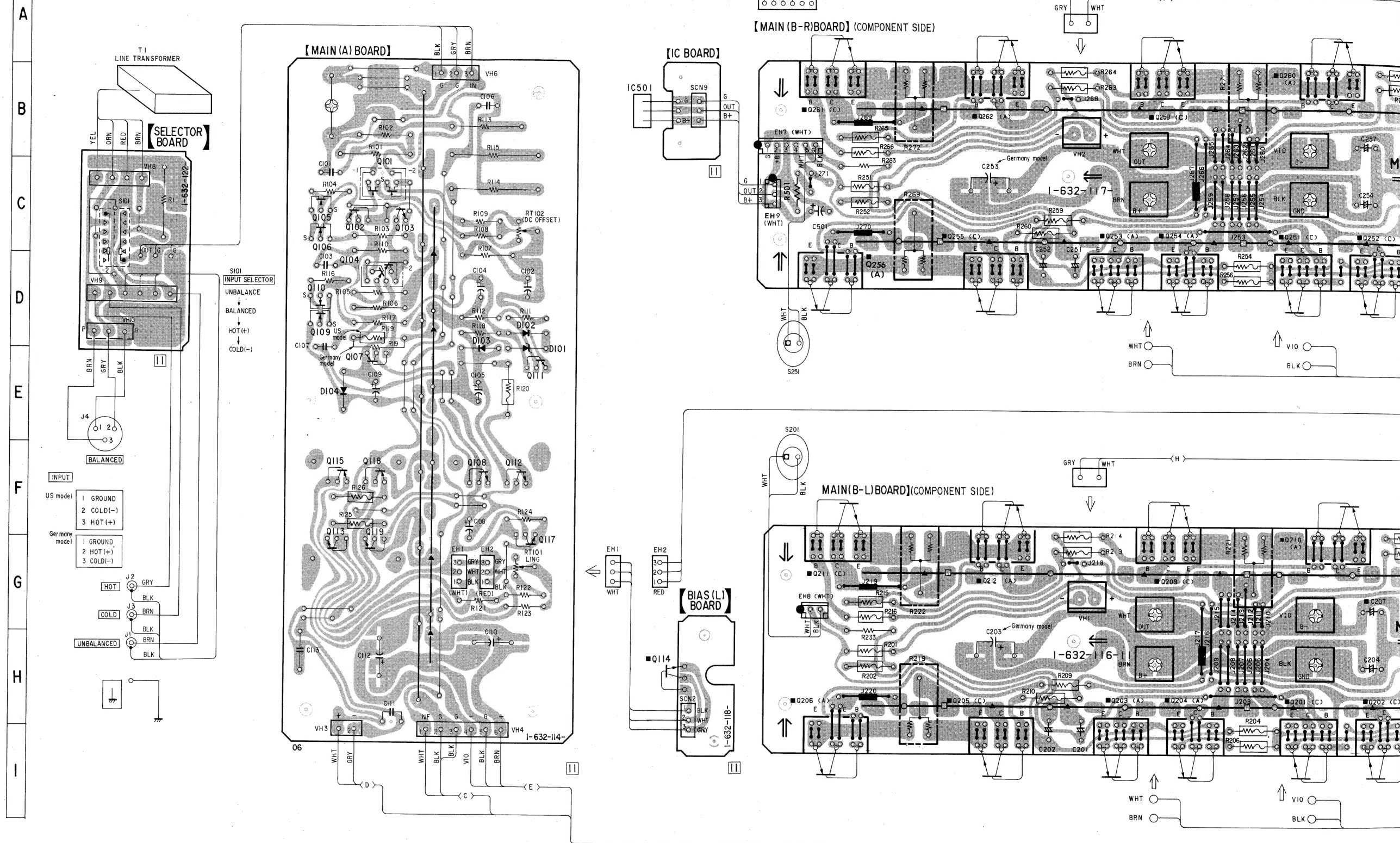
4-3. PRINTED WIRING BOARDS



Note:

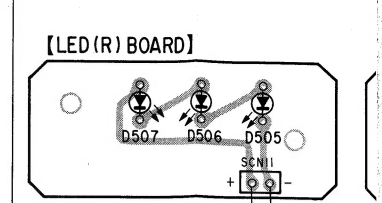
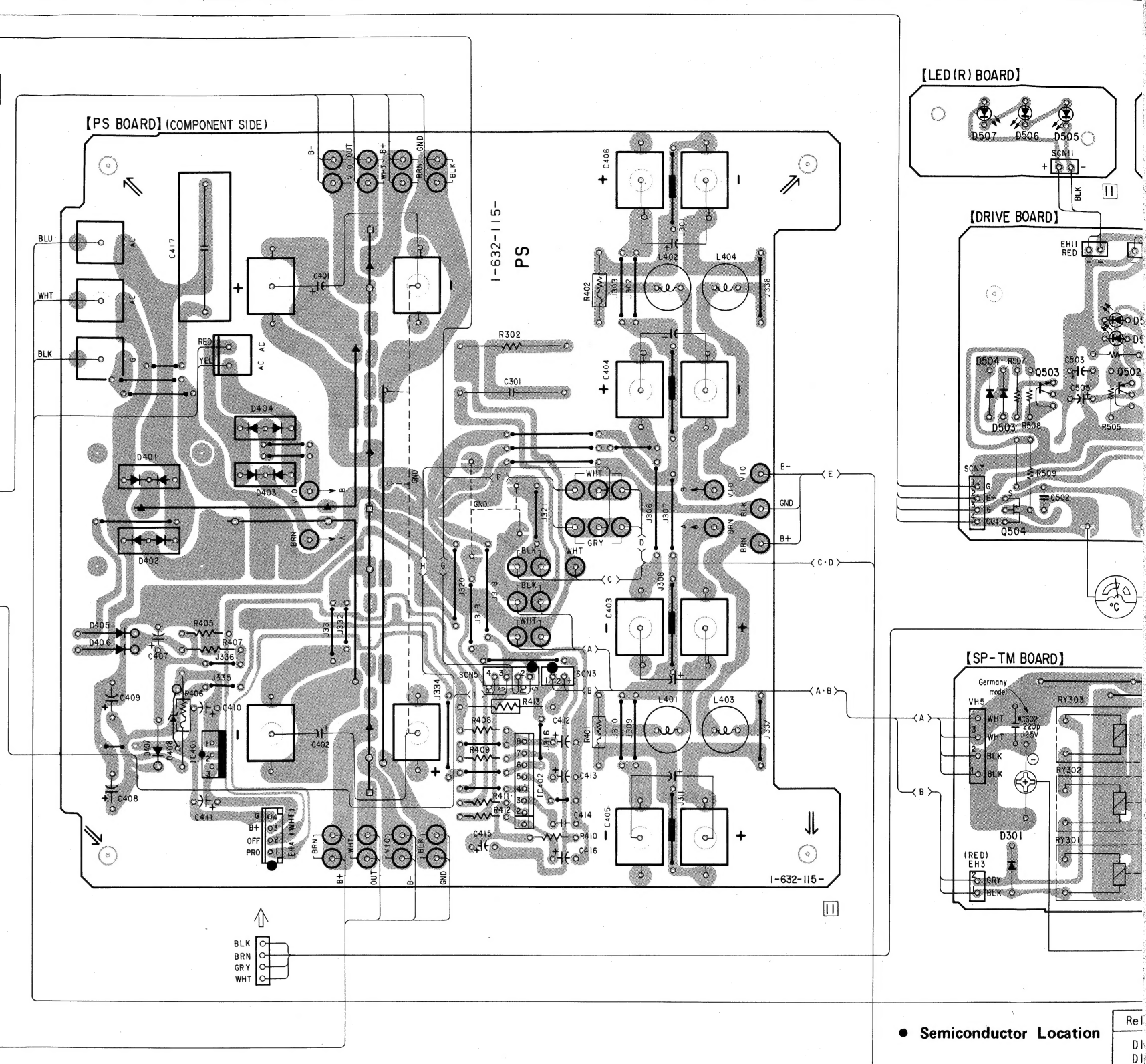
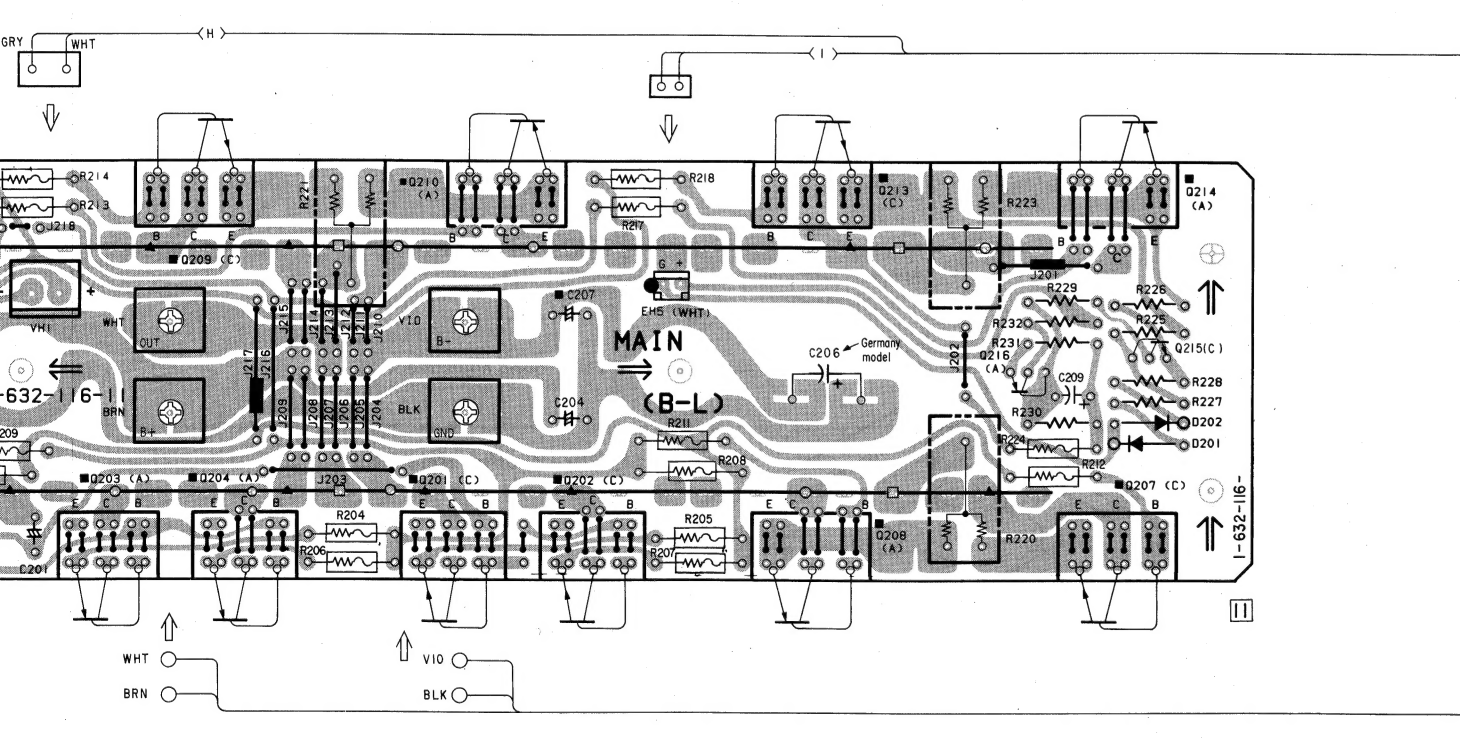
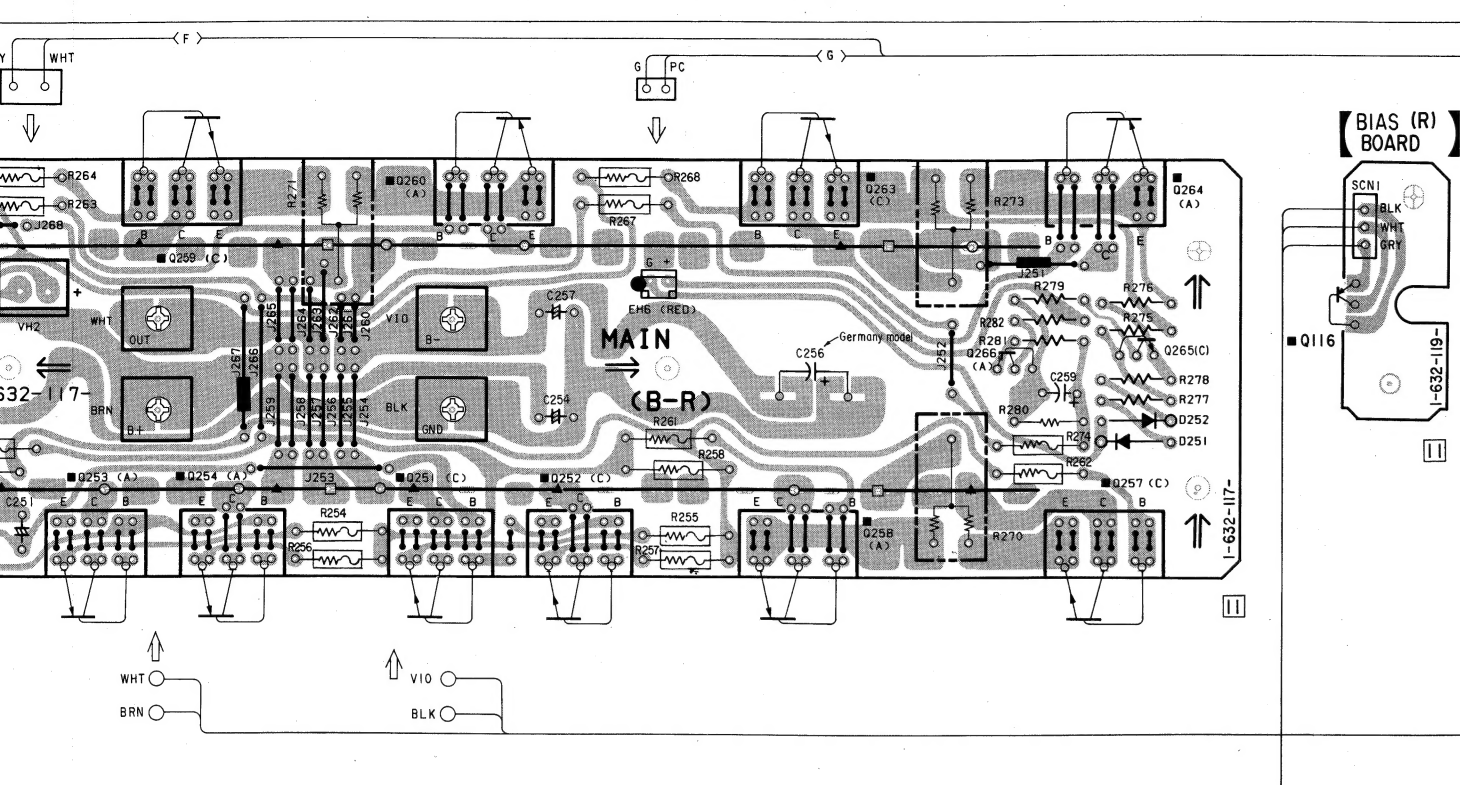
- : parts extracted from the component side.
- Bus bar in use with the mark.
- ▲ : B +
- : B -
- : CENTER VOLTAGE (OUTPUT)

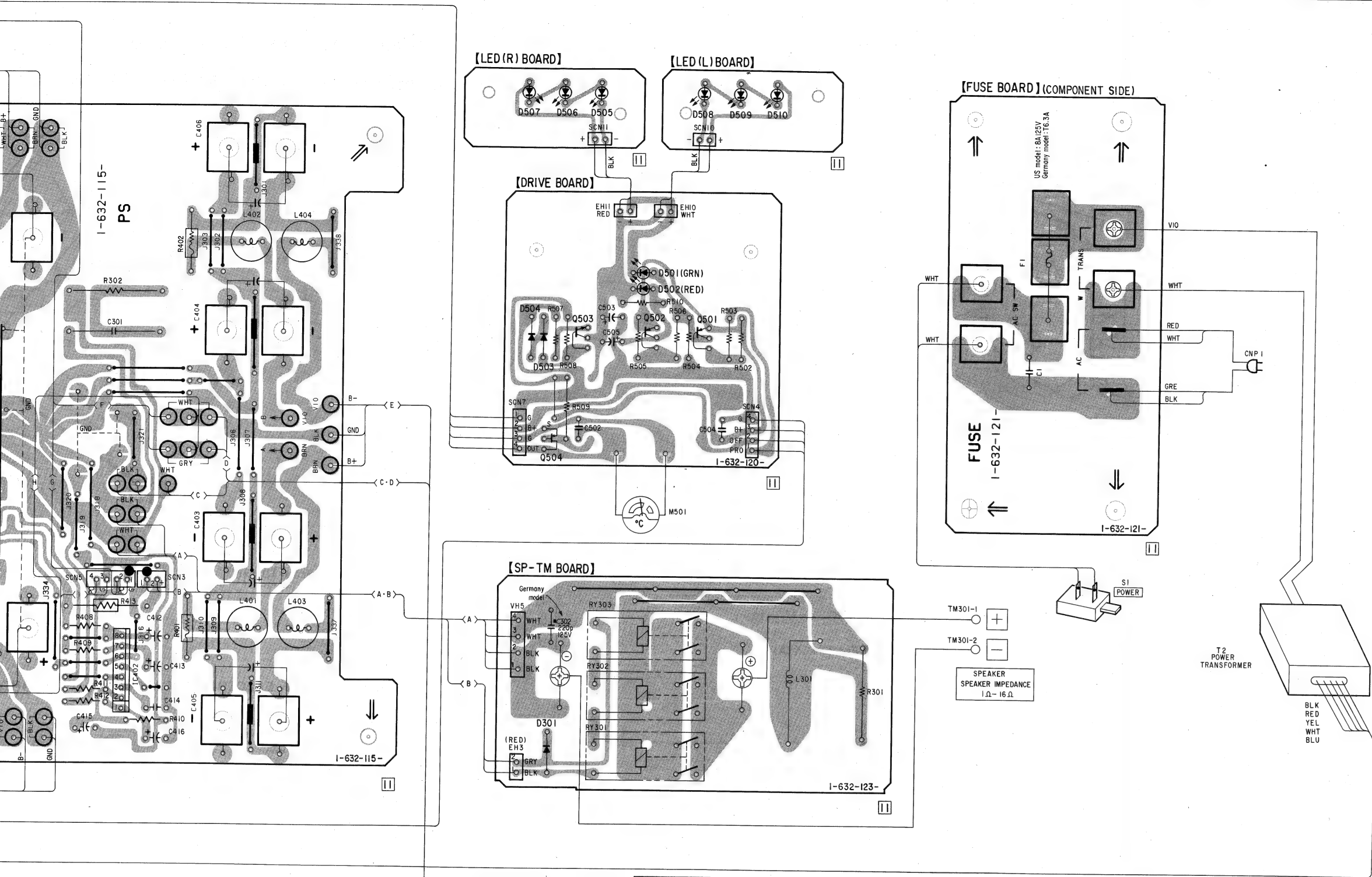
4-3. PRINTED WIRING BOARDS



Note:

- : parts extracted from the component side.
- Bus bar in use with the mark.
- ▲ : B +
- : B -
- : CENTER VOLTAGE (OUTPUT)



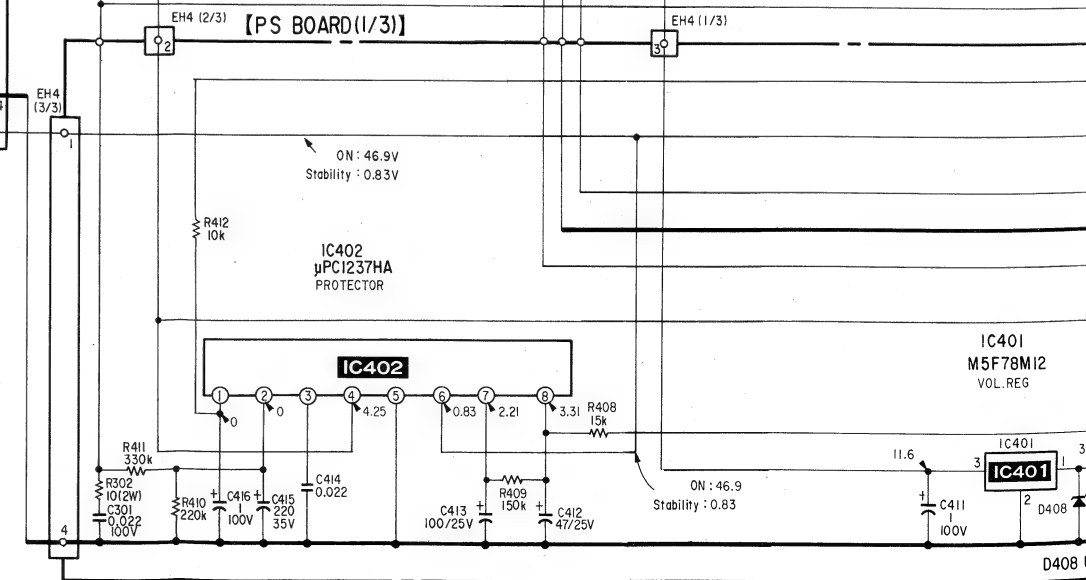
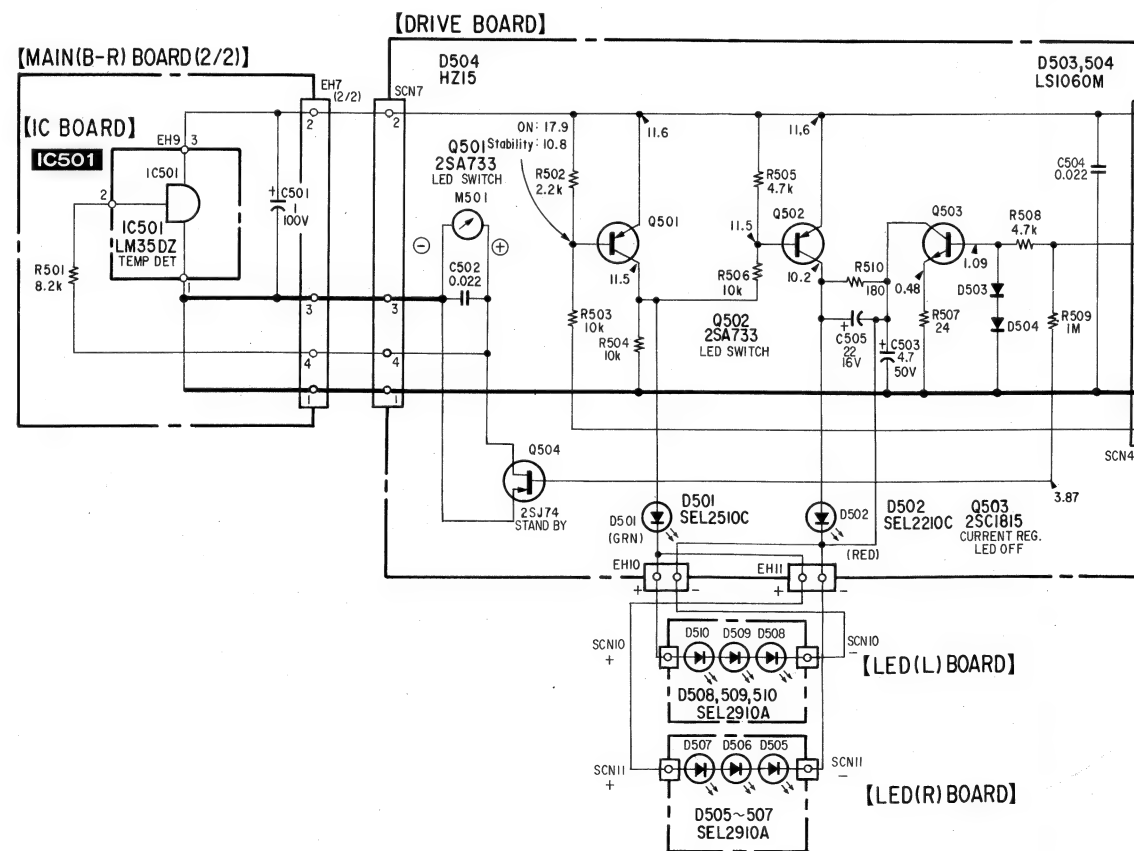
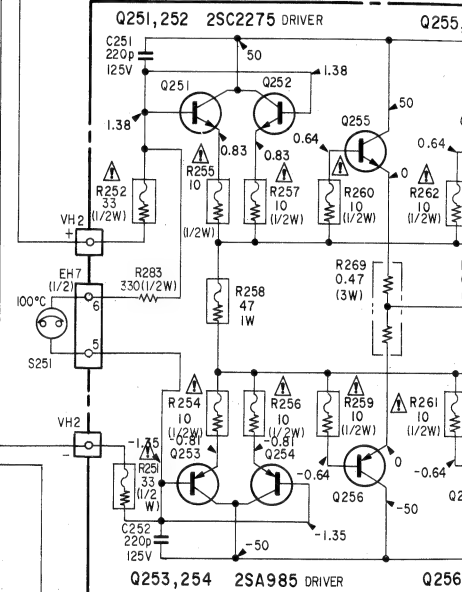
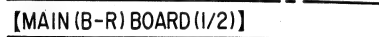
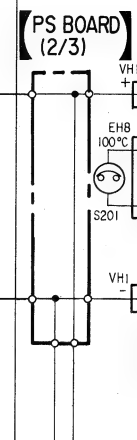
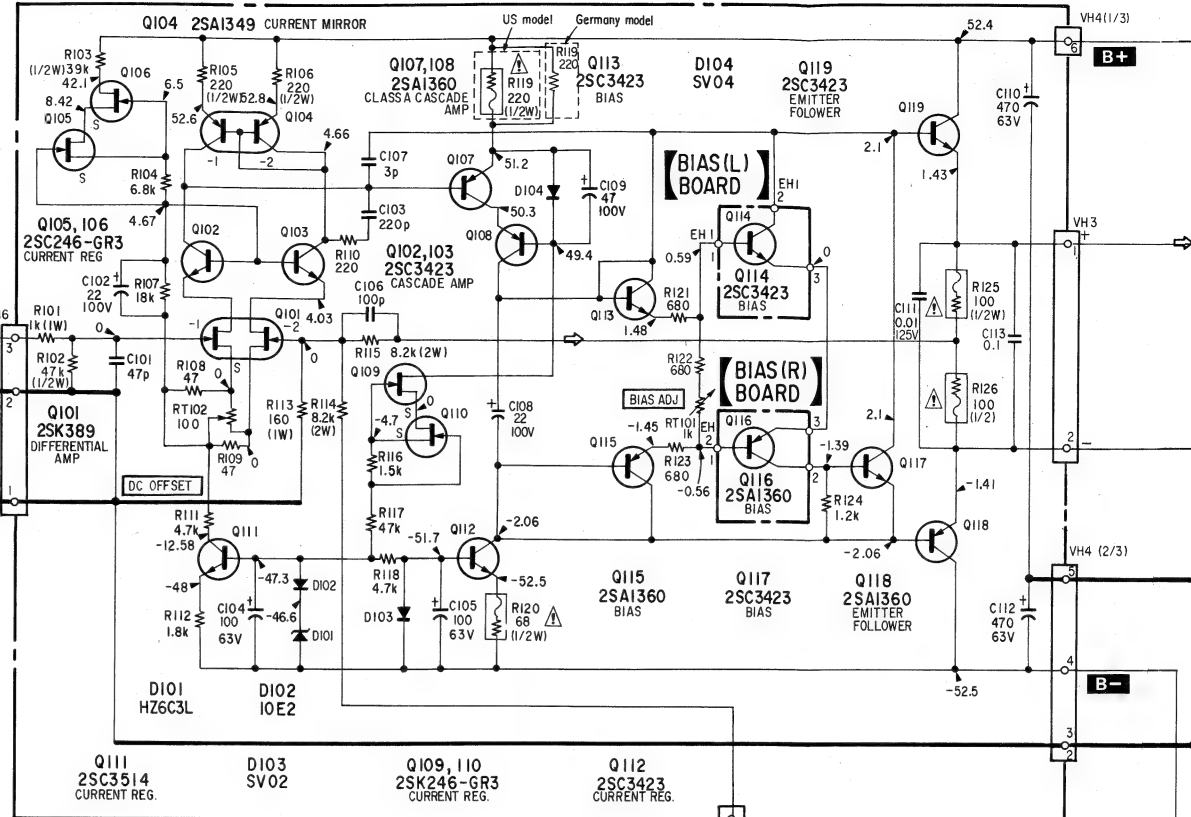


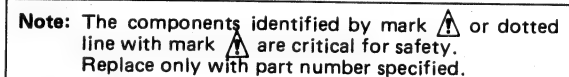
● Semiconductor Location

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D101	D-6	D502	C-30	Q105	C-4	Q204	H-13	Q256	D-9
D102	D-6	D503	D-29	Q106	C-4	Q205	H-10	Q257	C-18
D103	D-5	D504	D-28	Q107	E-4	Q206	H-9	Q258	D-17
D104	E-4	D505	B-29	Q108	F-5	Q207	H-18	Q259	B-13
D201	H-18	D506	B-29	Q109	D-4	Q208	H-18	Q260	B-14
D202	H-18	D507	B-28	Q110	D-4	Q209	G-13	Q261	B-9
D251	C-18	D508	B-30	Q111	E-6	Q210	F-14	Q262	B-11
D252	C-18	D509	B-30	Q112	F-6	Q211	G-9	Q263	B-17
D301	H-29	D510	B-31	Q113	F-4	Q212	G-11	Q264	B-18
D401	D-21			Q114	H-7	Q213	G-17	Q265	C-18
D402	E-21	IC401	G-22	Q115	F-4	Q214	G-18	Q266	C-17
D403	E-22	IC402	G-25	Q116	B-19	Q215	G-18	Q501	D-30
D404	D-22	IC501	B-7	Q117	G-6	Q216	G-17	Q502	D-30
D405	F-21			Q118	F-4	Q251	C-14	Q503	D-29
D406	F-21	Q101	C-4	Q119	F-4	Q252	C-15	Q504	E-29
D407	G-21	Q102	C-4	Q201	H-14	Q253	C-12		
D408	G-21	Q103	C-4	Q202	H-15	Q254	C-13		
D501	C-30	Q104	D-4	Q203	H-12	Q255	C-10		

【MAIN (A) BOARD】

【MAIN (B-L) BOARD】







SECTION 5 EXPLODED VIEWS

NOTE:

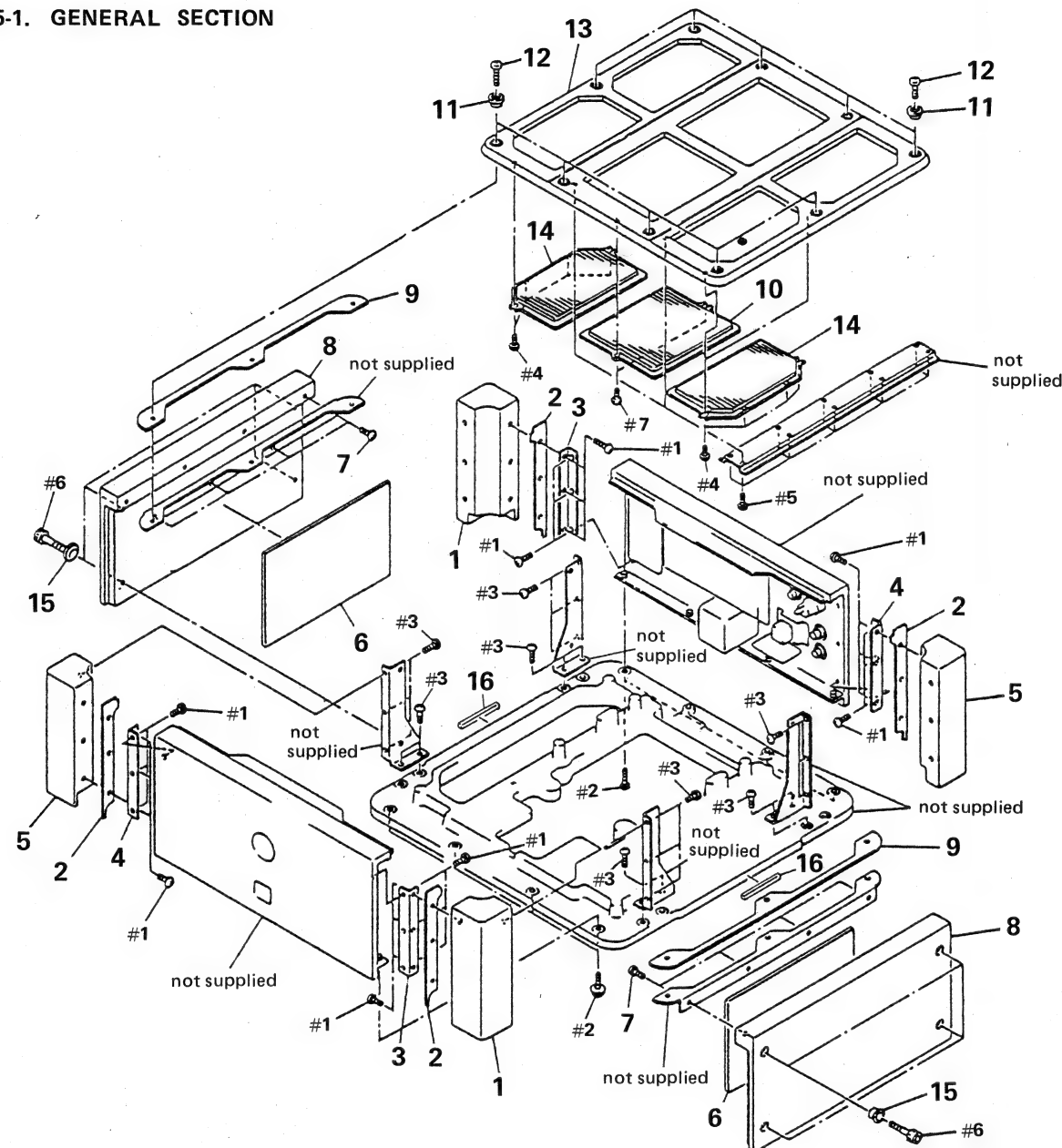
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
Example:
KNOB, BALANCE (WHITE)... (RED)

Parts color Cabinet's color

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

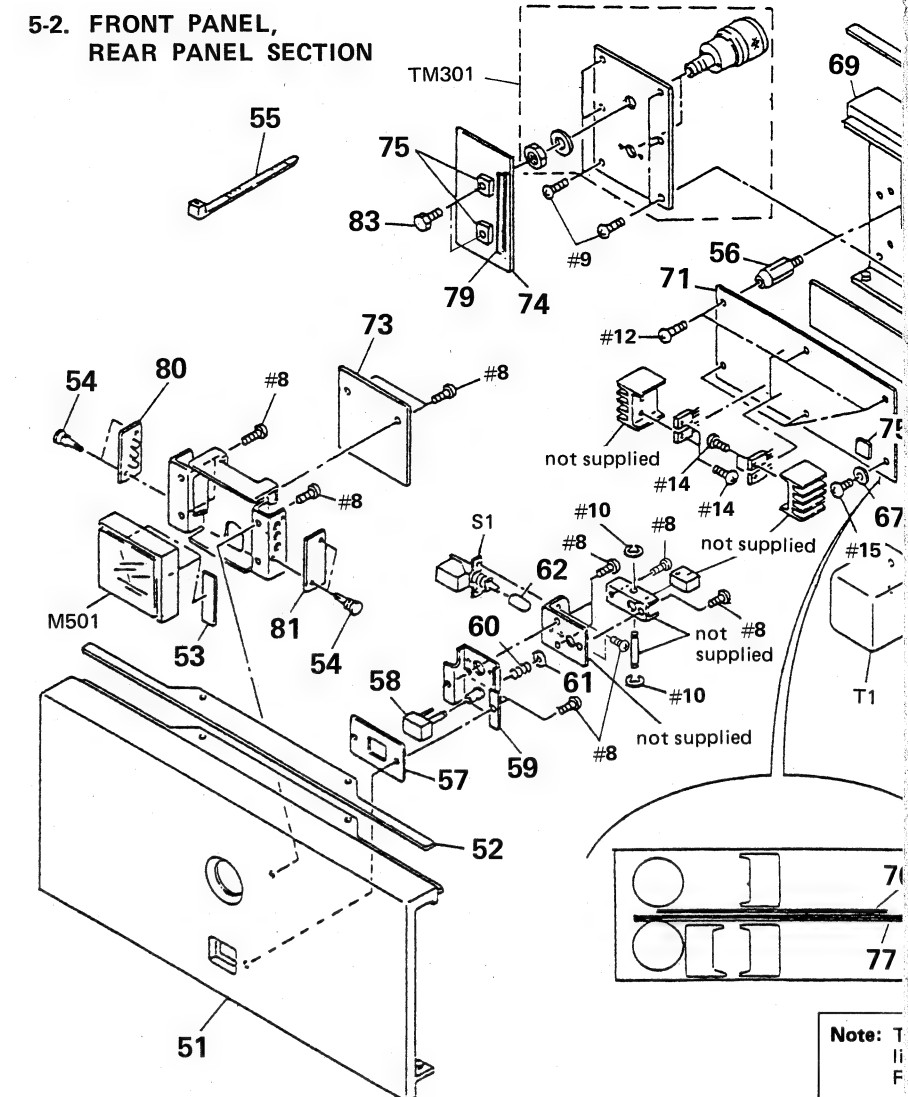
5-1. GENERAL SECTION





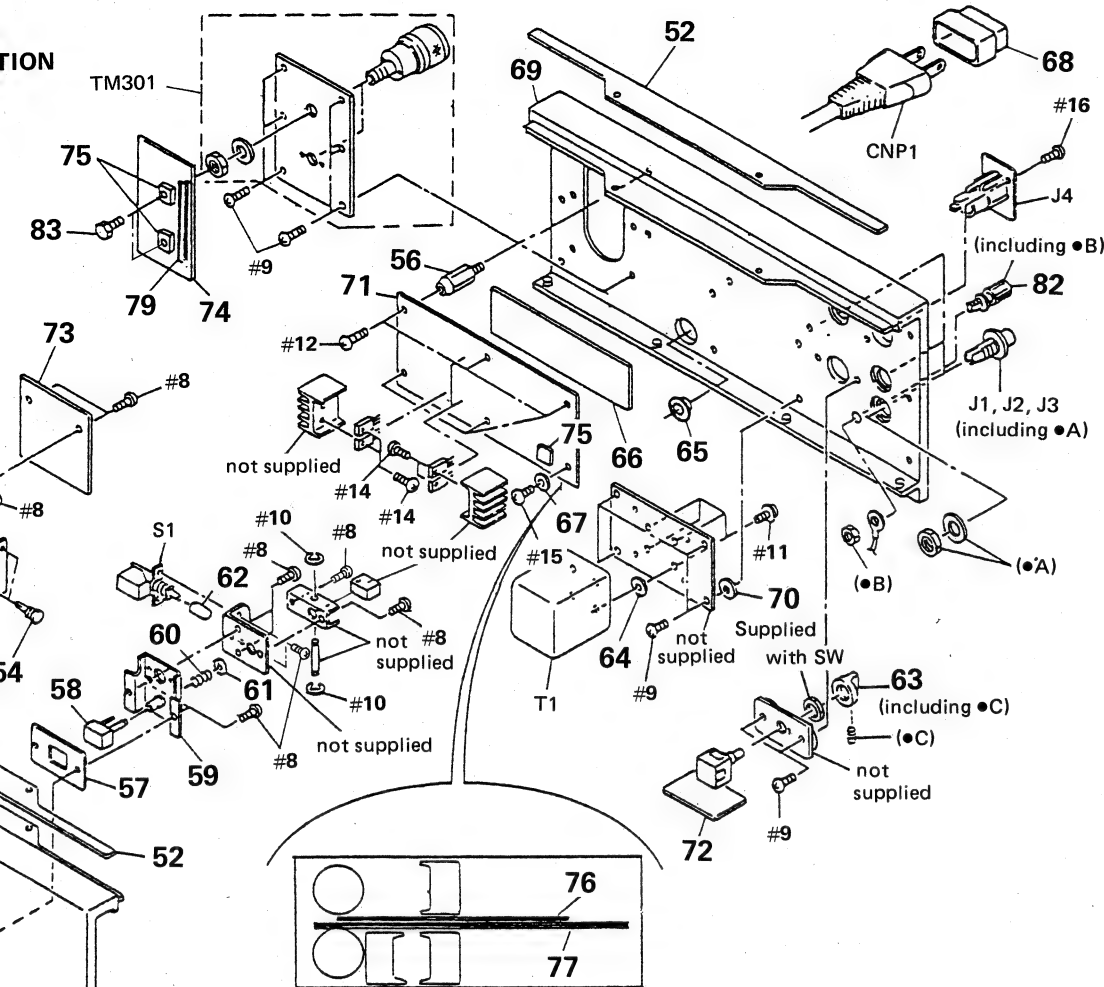
Ref. No.	Part No.	Description	Remark
1	4-935-237-01	PANEL (RIGHT), SIDE	
2	4-935-201-01	SPACER	
3	4-935-203-01	BRACKET (RIGHT)	
4	4-935-202-01	BRACKET (LEFT)	
5	4-935-236-01	PANEL (LEFT), SIDE	
6	9-911-851-XX	ABSORBENT, ACOUSTIC	
7	4-874-614-11	SCREW (4) (3.5X14), TAPPING	
8	X-4935-204-1	PLATE ASSY, SIDE, ORNAMENTAL	
9	4-935-232-01	PACKING (A), TOP PLATE (Germany)	
9	4-935-232-11	PACKING (A), TOP PLATE (US)	

Ref. No.	Part No.	Description	Remark
10	4-935-228-01	GRILLE (A)	
11	4-924-237-01	ESCUTCHEON (A)	
12	4-924-242-21	SCREW (M3X10), FLAT HEAD	
13	4-935-242-01	PLATE (A), TOP	
14	4-935-229-01	GRILLE (B)	
15	4-924-241-01	ESCUTCHEON (B)	
16	9-911-840-XX	CUSHION	

5-2. FRONT PANEL, REAR PANEL SECTION

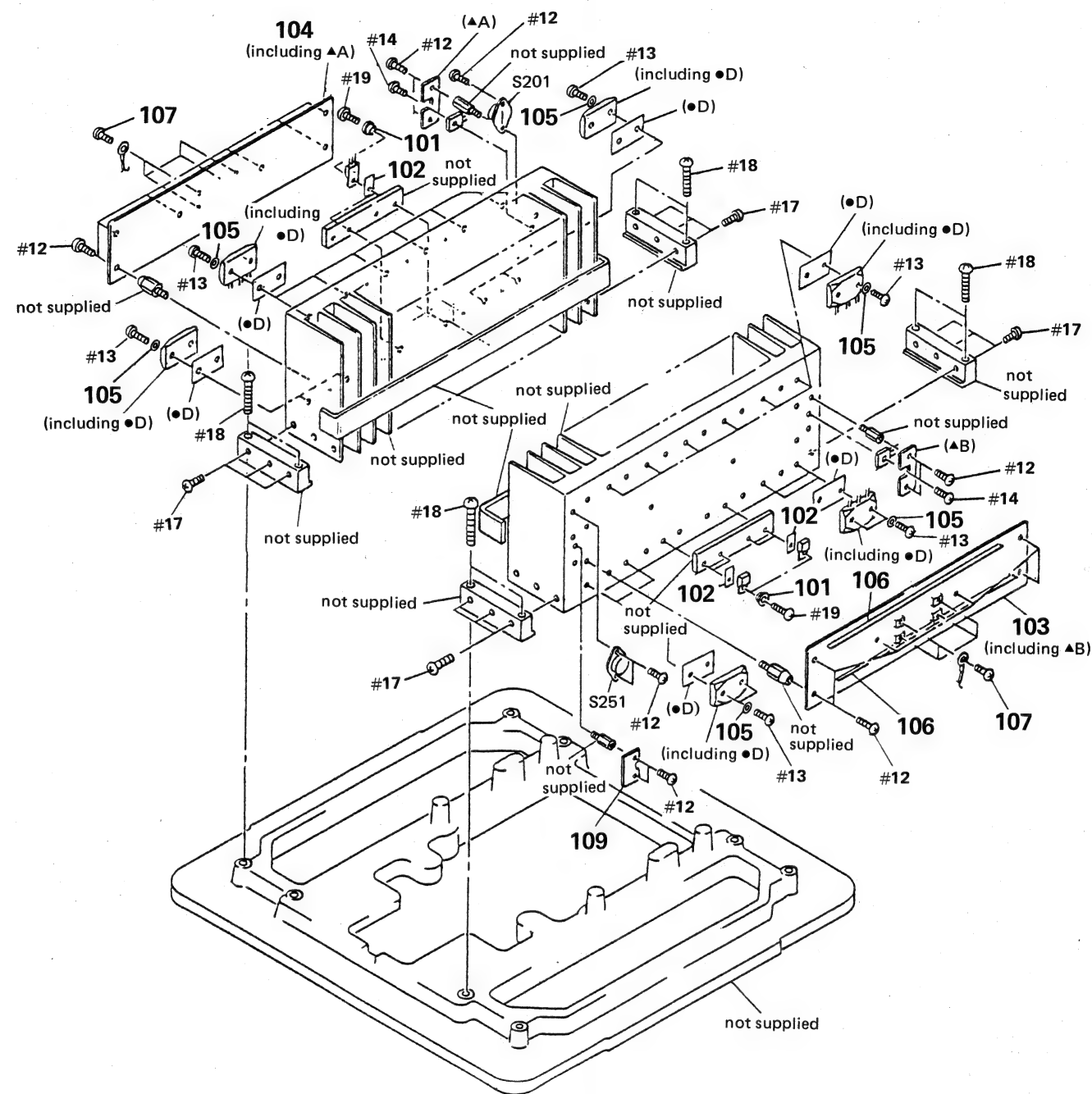


Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	4-935-234-01	PANEL, FRONT		71	* A-4345-3		
52	4-935-233-01	PACKING (B), TOP PLATE (Germany)		71	* A-4345-3		
52	4-935-233-11	PACKING (B), TOP PLATE (US)		72	* 1-632-12		
53	9-911-844-XX	CUSHION, GRILLE		73	* 1-632-12		
54	4-812-134-00	RIVET NYLON, 3.5		74	* 1-632-12		
55	3-655-653-21	BAND (TAITON), BINDING		75	* 4-835-63		
56	* 4-935-216-01	BOSS		76	1-564-29		
57	4-924-245-01	PLATE (E), ORNAMENTAL		77	* 1-564-39		
58	X-4935-201-1	BUTTON ASSY		78	* 1-560-24		
59	* X-4924-202-1	BRACKET (E) ASSY		79	* 1-560-24		
60	* 4-880-426-00	SPRING, COMPRESSION		80	* 1-633-16		
61	4-862-338-00	RING, STOPPER		81	* 1-633-16		
62	4-935-221-01	CAP		82	* 4-935-25		
63	4-924-256-01	KNOB (B)		83	* 4-931-96		
64	4-885-984-21	WASHER		CNP1	 1-559-47		
65	* 4-946-389-01	ESCUTCHEON, CORD		CNP1	 1-559-27		
66	9-911-851-XX	ABSORBENT, ACOUSTIC		J1	1-568-91		
67	4-908-961-11	WASHER		J2	1-568-91		
68	4-362-304-00	GUARD, PLUG (US)		J3	1-568-91		
69	* 4-935-235-21	PANEL, BACK (Germany)		J4	1-568-91		
69	* 4-935-235-11	PANEL, BACK (US)		M501	1-520-50		
70	4-916-751-01	WASHER		S1	1-554-56		
				T1	1-424-29		
				TM301	1-537-24		



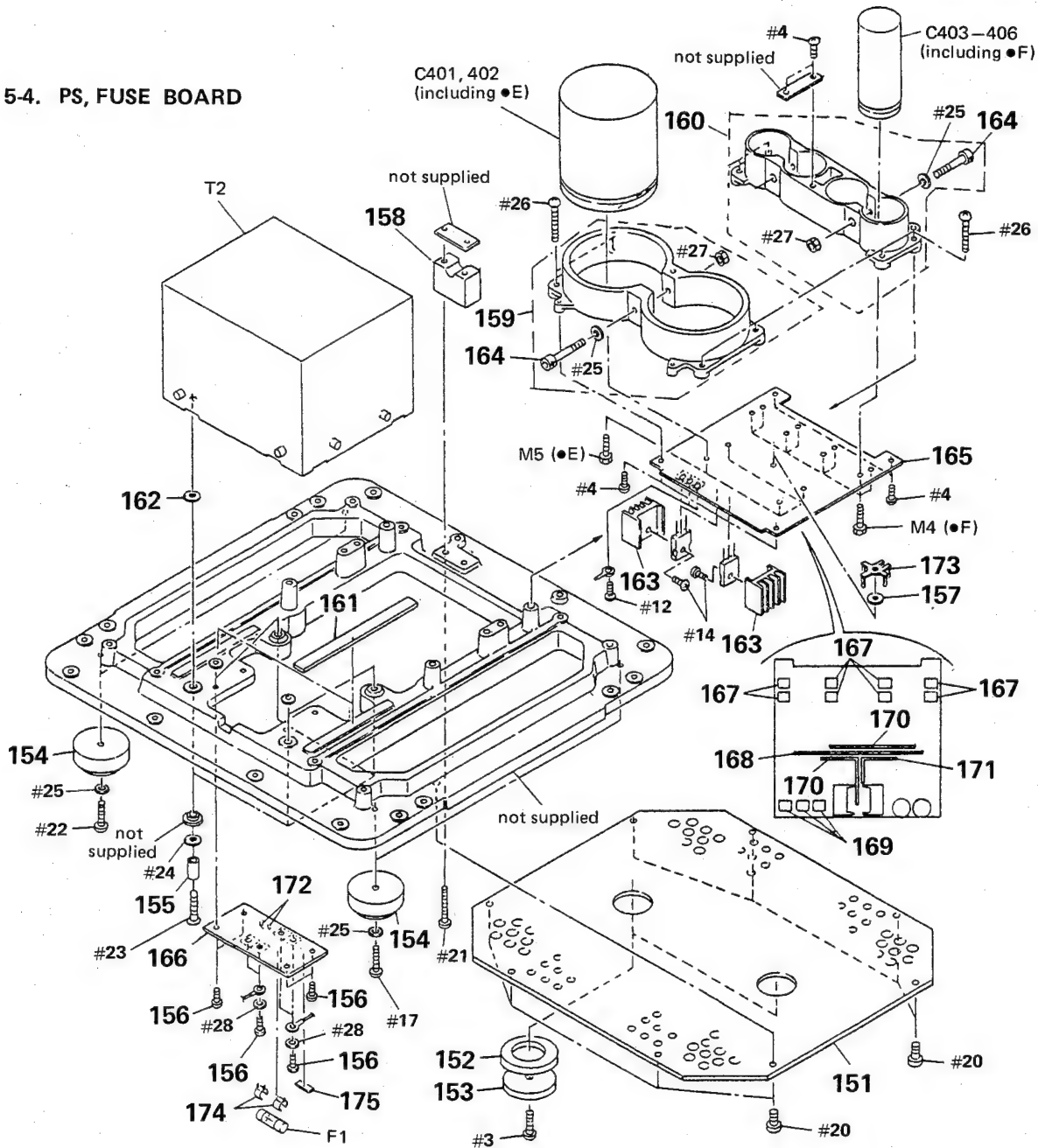
Description	Remark	Ref. No.	Part No.	Description	Remark
PANEL, FRONT		71	* A-4345-337-A MAIN (A) BOARD, COMPLETE (US)		
		71	* A-4345-353-A MAIN (A) BOARD, COMPLETE (Germany)		
PACKING (B), TOP PLATE (Germany)		72	* 1-632-122-11 SELECTOR BOARD		
PACKING (B), TOP PLATE (US)		73	* 1-632-120-11 DRIVE BOARD		
CUSHION, GRILLE		74	* 1-632-123-11 SP. TM BOARD		
RIVET NYLON, 3.5		75	* 4-835-639-00 PLATE, GROUND		
BAND (TAITON), BINDING		76	1-564-295-00 BAR, BUS		
BOSS		77	* 1-564-393-00 BUS BAR 9P		
PLATE (E), ORNAMENTAL		78	* 1-560-242-21 BUS BAR 4P		
BUTTON ASSY		79	* 1-560-242-11 BUS BAR 3P		
BRACKET (E) ASSY		80	* 1-633-166-11 LED (L) BOARD		
SPRING, COMPRESSION		81	* 1-633-167-11 LED (R) BOARD		
RING, STOPPER		82	* 4-935-253-01 TERMINAL, SP		
CAP		83	* 4-931-964-01 SCREW (M4X6)		
KNOB (B)		CNP1	▲ 1-559-479-11 CORD, POWER (US)		
WASHER		CNP1	▲ 1-559-271-11 CORD, POWER (Germany)		
ESCUTCHEON, CORD		J1	1-568-918-11 JACK, PIN 1P (UNBALANCED)		
ABSORBENT, ACOUSTIC		J2	1-568-918-11 JACK, PIN 1P (HOT)		
WASHER		J3	1-568-918-11 JACK, PIN 1P (COLD)		
GUARD, PLUG (US)		J4	1-568-917-11 CONNECTOR, CANON (SOCKET) 3P (BALANCED)		
PANEL, BACK (Germany)		M501	1-520-507-11 METER		
PANEL, BACK (US)		S1	1-554-538-00 SWITCH, PUSH (AC POWER) (1 KEY) (POWER)		
WASHER		T1	1-424-299-11 TRANSFORMER, LINE		
		TM301	1-537-248-11 TERMINAL BOARD (SPEAKER 2P)		

5-3. HEAT SINK SECTION





Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
101	2-371-561-00	BUSHING (P), INSULATING		105	4-908-961-01	WASHER	
102	4-916-721-01	SHEET, INSULATING		106	1-565-063-11	BAR, BUS	
103	* A-4345-340-A	MAIN (B-R) BOARD, COMPLETE (US)		107	* 4-931-964-01	SCREW (M4X6)	
103	* A-4345-355-A	MAIN (B-R) BOARD, COMPLETE (Germany)		109	* 1-633-170-11	IC BOARD	
104	* A-4345-339-A	MAIN (B-L) BOARD, COMPLETE (US)		S201	1-576-080-11	THERMOSTAT	
104	* A-4345-354-A	MAIN (B-L) BOARD, COMPLETE (Germany)		S251	1-576-080-11	THERMOSTAT	

5-4. PS, FUSE BOARD



Ref. No.	Part No.	Description	Remark
151	4-935-240-01	BOARD, BOTTOM	
152	4-935-250-11	WASHER	
153	4-935-252-01	WASHER	
154	X-4924-207-1	FOOT ASSY	
155	* 2-640-757-01	SPACER	
156	* 4-931-964-01	SCREW (M4X6)	
157	* 3-555-872-21	SPACER	
158	* 4-946-387-01	STOPPER, CORD	
159	* X-4935-205-1	HOLDER (A) ASSY	
160	* X-4935-206-1	HOLDER (B) ASSY	
161	* 4-935-249-01	ABSORBENT, VIBRATION	
162	4-935-250-01	WASHER	
163	* 4-921-402-01	HEAT SINK	
164	4-946-777-01	BOLT (C4X55), HEXAGON SOCKET	
165	* A-4345-075-A	PS BOARD, COMPLETE (Germany)	
165	* A-4345-338-A	PS BOARD, COMPLETE (US)	
166	* 1-632-121-11	FUSE BOARD	
167	* 4-835-639-00	PLATE, GROUND	
168	1-564-295-00	BAR, BUS	
170	* 1-560-242-31	BUS BAR 4P	

Ref. No.	Part No.	Description	Remark
171	* 1-560-242-21	BUS BAR 4P	
172	1-535-476-11	TERMINAL	
173	* 4-916-791-01	PLATE, GROUND 5P	
174	* 1-533-185-11	HOLDER, FUSE (US)	
174	1-533-183-11	HOLDER, FUSE (Germany)	
175	3-701-947-19	LABEL (T6.3A), FUSE (Germany)	
C401	1-125-583-11	CAP, ELECT 20000MF 63V	
C402	1-125-583-11	CAP, ELECT 20000MF 63V	
C403	1-125-597-11	CAP, ELECT 3300MF 63V	
C404	1-125-597-11	CAP, ELECT 3300MF 63V	
C405	1-125-581-11	CAP, ELECT 6800MF 63V	
C406	1-125-581-11	CAP, ELECT 6800MF 63V	
F1	△ 1-532-510-00	FUSE, GLASS TUBE (8.0A) (US)	
F1	△ 1-532-325-00	FUSE, TIME-LAG (6.3A) (Germany)	
T2	△ 1-450-490-11	TRANSFORMER, POWER (US)	
T2	△ 1-450-491-11	TRANSFORMER, POWER (Germany)	

Note: The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

MAIN(A)

PS

BIAS (L)

BIAS (R)



SECTION 6

ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- —XX, —X mean standardized parts, so they may have some difference from the original one.
- **RESISTORS**
All resistors are in ohms
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable

- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
In each case, $u: \mu$, for example:
 $uA...: \mu A..., uPA...: \mu PA...,$
 $uPB...: \mu PB..., uPC...: \mu PC...,$
 $uPD...: \mu PD...$
- CAPACITORS
 $uF: \mu F$
- COILS
 $uH: \mu H$

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref. No.	Part No.	Description	Remark
* A-4345-337-A	MAIN (A) BOARD, COMPLETE (US)		
* A-4345-353-A	MAIN (A) BOARD, COMPLETE (Germany)		

* A-4345-075-A	PS BOARD, COMPLETE (Germany)		
* A-4345-338-A	PS BOARD, COMPLETE (US)		

1-535-730-21	LEAD, JUMPER (OFC)		
1-535-731-21	LEAD, JUMPER (OFC)		
* 1-560-242-21	BUS BAR 4P		
* 1-560-242-31	BUS BAR 5P		
1-564-295-00	BAR, BUS		
* 1-564-393-00	BUS BAR 9P		
* 3-555-872-21	SPACER		
* 4-835-639-00	PLATE, GROUND		
* 4-916-791-01	PLATE, GROUND, 5P		
* 4-921-402-01	HEAT SINK		
7-682-148-15	SCREW, TR		
< CAPACITOR >			
C101	1-104-322-11	POLYSTYRENE 47PF	10% 400V
C102	1-124-748-11	ELECT 22uF	20% 100V
C103	1-104-233-00	POLYSTYRENE 220PF	10% 125V
C104	1-124-130-00	ELECT 100uF	20% 63V
C105	1-124-130-00	ELECT 100uF	20% 63V
C106	1-104-269-11	POLYSTYRENE 100PF	10% 125V
C107	1-104-320-11	POLYSTYRENE 3PF	10% 400V
C108	1-124-748-11	ELECT 22uF	20% 100V
C109	1-126-988-11	ELECT 47uF	20% 100V
C110	1-125-580-11	ELECT 470uF	20% 63V
C111	1-104-319-11	POLYSTYRENE 10000PF	10% 125V
C112	1-125-580-11	ELECT 470uF	20% 63V
C113	1-130-321-00	FILM 0.1uF	5% 100V
C301	1-136-944-11	FILM 0.022uF	5% 0
C401	1-125-583-11	CAP, ELECT 20000MF	63V
Ref. No.	Part No.	Description	Remark
C402	1-125-583-11	CAP, ELECT 20000MF	63V
C403	1-125-597-11	CAP, ELECT 3300MF	63V
C404	1-125-597-11	CAP, ELECT 3300MF	63V
C405	1-125-581-11	CAP, ELECT 6800MF	63V
C406	1-125-581-11	CAP, ELECT 6800MF	63V
C407	1-123-380-00	ELECT 1uF	20% 100V
C408	1-126-066-11	ELECT 470uF	20% 63V
C409	1-126-066-11	ELECT 470uF	20% 63V
C410	1-123-380-00	ELECT 1uF	20% 100V
C411	1-123-380-00	ELECT 1uF	20% 100V
C412	1-124-910-11	ELECT 47uF	20% 50V
C413	1-124-122-11	ELECT 100uF	20% 50V
C414	1-136-157-00	FILM 0.022uF	5% 50V
C415	1-124-484-11	ELECT 220uF	20% 35V
C416	1-123-380-00	ELECT 1uF	20% 100V
C417	1-136-880-11	FILM 2.2uF	10% 160V
< DIODE >			
D101	8-719-910-68	DIODE HZ6C2L	
D102	8-719-200-02	DIODE 10E2	
D103	8-719-300-02	DIODE SV-02	
D104	8-719-300-04	DIODE SV-04	
D401	8-719-210-25	DIODE C25P20F	
D402	8-719-210-26	DIODE C25P20FR	
D403	8-719-200-39	DIODE C16P20F	
D404	8-719-200-40	DIODE C16P20FR	
D405	8-719-200-02	DIODE 10E2	
D406	8-719-200-02	DIODE 10E2	
D407	8-719-200-02	DIODE 10E2	
D408	8-719-016-18	DIODE UZP-33BC	
< CONNECTOR >			
EH1	* 1-564-506-11	PLUG, CONNECTOR 3P	
EH2	* 1-564-506-11	PLUG, CONNECTOR 3P	
EH4	* 1-564-507-11	PLUG, CONNECTOR 4P	

MAIN(A)

PS

BIAS (L)

BIAS (R)

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
< IC >							
IC401	8-759-604-39	IC M5F78M12		Q254	8-729-141-10	TRANSISTOR 2SA985A-QP	
IC402	8-759-111-68	IC uPC1237HA		Q255	8-729-300-11	TRANSISTOR 2SC2922	
< COIL >				Q256	8-729-300-10	TRANSISTOR 2SA1216	
L401	* 1-422-203-11	COIL, AIR-CORE 180uH		Q257	8-729-300-11	TRANSISTOR 2SC2922	
L402	* 1-422-203-11	COIL, AIR-CORE 180uH		Q258	8-729-300-10	TRANSISTOR 2SA1216	
L403	* 1-422-203-11	COIL, AIR-CORE 180uH					
L404	* 1-422-203-11	COIL, AIR-CORE 180uH		Q259	8-729-300-11	TRANSISTOR 2SC2922	
< TRANSISTOR >				Q260	8-729-300-10	TRANSISTOR 2SA1216	
Q101	8-729-203-21	TRANSISTOR 2SK389-GR		Q261	8-729-300-11	TRANSISTOR 2SC2922	
Q102	8-729-203-45	TRANSISTOR 2SC3423		Q262	8-729-300-10	TRANSISTOR 2SA1216	
Q103	8-729-203-45	TRANSISTOR 2SC3423		Q263	8-729-300-11	TRANSISTOR 2SC2922	
Q104	8-729-232-00	TRANSISTOR 2SA1349-GRBL		Q264	8-729-300-10	TRANSISTOR 2SA1216	
Q105	8-729-202-67	TRANSISTOR 2SK246GR3		< RESISTOR >			
Q106	8-729-202-67	TRANSISTOR 2SK246GR3		R101	1-259-676-11	CARBON 1K 2% 1W	
Q107	8-729-209-17	TRANSISTOR 2SA1360		R102	1-259-595-11	CARBON 47K 1% 1/2W	
Q108	8-729-209-17	TRANSISTOR 2SA1360		R103	1-249-711-11	CARBON 39K 5% 1/2W	
Q109	8-729-202-67	TRANSISTOR 2SK246GR3		R104	1-247-723-11	CARBON 6.8K 5% 1/4W	
Q110	8-729-202-67	TRANSISTOR 2SK246GR3		R105	1-259-539-11	CARBON 220 1% 1/2W	
Q111	8-729-104-18	TRANSISTOR 2SC3514		R106	1-259-539-11	CARBON 220 1% 1/2W	
Q112	8-729-203-45	TRANSISTOR 2SC3423		R107	1-259-585-11	CARBON 18K 1% 1/2W	
Q113	8-729-203-45	TRANSISTOR 2SC3423		R108	1-249-520-11	CARBON 47 5% 1/4W	
Q114	8-729-203-45	TRANSISTOR 2SC3423		R109	1-249-520-11	CARBON 47 5% 1/4W	
Q115	8-729-209-17	TRANSISTOR 2SA1360		R110	1-259-539-11	CARBON 220 1% 1/2W	
Q116	8-729-209-17	TRANSISTOR 2SA1360		R111	1-247-721-11	CARBON 4.7K 5% 1/4W	
Q117	8-729-203-45	TRANSISTOR 2SC3423		R112	1-247-716-11	CARBON 1.8K 5% 1/4W	
Q118	8-729-209-17	TRANSISTOR 2SA1360		R113	1-259-657-11	CARBON 160 2% 1W	
Q119	8-729-203-45	TRANSISTOR 2SC3423		R114	1-259-819-11	CARBON 8.2K 2% 2W	
Q201	8-729-127-53	TRANSISTOR 2SC2275-P		R115	1-259-819-11	CARBON 8.2K 2% 2W	
Q202	8-729-127-53	TRANSISTOR 2SC2275-P		R116	1-249-556-11	CARBON 1.5K 5% 1/4W	
Q203	8-729-141-10	TRANSISTOR 2SA985A-QP		R117	1-249-713-11	CARBON 47K 5% 1/2W	
Q204	8-729-141-10	TRANSISTOR 2SA985A-QP		R118	1-247-721-11	CARBON 4.7K 5% 1/4W	
Q205	8-729-300-11	TRANSISTOR 2SC2922		R119	1-219-030-11	FUSIBLE 220 5% 1/2W (US)	
Q206	8-729-300-10	TRANSISTOR 2SA1216		R119	1-259-539-11	CARBON 220 1% 1/2W (Germany)	
Q207	8-729-300-11	TRANSISTOR 2SC2922		R120	△ 1-219-018-11	FUSIBLE 68 5% 1/2W	
Q208	8-729-300-10	TRANSISTOR 2SA1216		R121	1-247-711-11	CARBON 680 5% 1/4W	
Q209	8-729-300-11	TRANSISTOR 2SC2922		R122	1-247-711-11	CARBON 680 5% 1/4W	
Q210	8-729-300-10	TRANSISTOR 2SA1216		R123	1-247-711-11	CARBON 680 5% 1/4W	
Q211	8-729-300-11	TRANSISTOR 2SC2922		R124	1-247-714-11	CARBON 1.2K 5% 1/4W	
Q212	8-729-300-10	TRANSISTOR 2SA1216		R125	△ 1-219-022-11	FUSIBLE 100 5% 1/2W	
Q213	8-729-300-11	TRANSISTOR 2SC2922		R126	△ 1-219-022-11	FUSIBLE 100 5% 1/2W	
Q214	8-729-300-10	TRANSISTOR 2SA1216		R302	1-259-749-11	CARBON 10 2% 2W	
Q251	8-729-127-53	TRANSISTOR 2SC2275-P		R401	△ 1-219-087-11	FUSIBLE 100 5% 1W	
Q252	8-729-127-53	TRANSISTOR 2SC2275-P		R402	△ 1-219-087-11	FUSIBLE 100 5% 1W	
Q253	8-729-141-10	TRANSISTOR 2SA985A-QP		R405	1-249-462-11	CARBON 22K 5% 1/4W	
				R406	△ 1-215-918-00	METAL OXIDE 1.5K 5% 3W F	
				R407	△ 1-217-981-11	FUSIBLE 2.2 5% 1/2W	
				R408	1-249-460-11	CARBON 15K 5% 1/4W	
				R409	1-249-604-11	CARBON 150K 5% 1/4W	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

MAIN(A)**PS****BIAS (L)****BIAS (R)****MAIN(B-R)****MAIN(B-L)****DRIVE****FUSE****SELECTOR****SP.TM****LED(L)****LED(R)**

Ref. No.	Part No.	Description	Remark
R410	1-247-887-00	CARBON 220K 5% 1/4W	
R411	1-247-891-00	CARBON 330K 5% 1/4W	
R412	1-247-725-11	CARBON 10K 5% 1/4W	
R413	△ 1-216-476-11	METAL OXIDE 180 5% 3W F	

< VARIABLE RESISTOR >

RT101	1-224-249-XX	RES. ADJ. METAL GLAZE 1K	
RT102	1-224-247-XX	RES. ADJ. METAL GLAZE 100	

< CONNECTOR >

VH3	1-564-320-00	PIN. CONNECTOR 2P	
VH4	* 1-564-243-00	PIN. CONNECTOR 6P	
VH6	* 1-564-104-00	PIN. CONNECTOR 3P	

- * A-4345-340-A MAIN (B-R) BOARD, COMPLETE (US)
- * A-4345-355-A MAIN (B-R) BOARD, COMPLETE (Germany)
- * A-4345-339-A MAIN (B-L) BOARD, COMPLETE (US)
- * A-4345-354-A MAIN (B-L) BOARD, COMPLETE (Germany)

- * 1-632-120-11 DRIVE BOARD

- * 1-632-121-11 FUSE BOARD

- * 1-632-122-11 SELECTOR BOARD

- * 1-632-123-11 SP. TM BOARD

- * 1-633-166-11 LED (L) BOARD

- * 1-633-167-11 LED (R) BOARD

1-533-183-11 HOLDER, FUSE

1-535-476-11 TERMINAL

- * 1-535-730-21 LEAD, JUMPER (OFC)

- * 1-560-242-11 BUS BAR 3P

- * 1-560-242-21 BUS BAR 4P

1-565-063-11 BAR, BUS

- * 4-835-639-00 PLATE, GROUND

< CAPACITOR >

C1	1-161-742-00	CERAMIC 0.0022uF 20% 400V	
C201	1-104-233-00	POLYSTYRENE 220PF 10% 125V	
C202	1-104-233-00	POLYSTYRENE 220PF 10% 125V	
C203	1-125-582-11	ELECT 470uF 20% 63V (Germany)	
C204	1-104-319-11	POLYSTYRENE 10000PF 10% 125V	
C206	1-125-582-11	ELECT 470uF 20% 63V (Germany)	
C207	1-104-319-11	POLYSTYRENE 10000PF 10% 125V	
C209	1-123-369-00	ELECT 4.7uF 20% 63V	
C251	1-104-233-00	POLYSTYRENE 220PF 10% 125V	
C252	1-104-233-00	POLYSTYRENE 220PF 10% 125V	

Ref. No.	Part No.	Description	Remark
C253	1-125-582-11	ELECT 470uF 20% 63V (Germany)	
C254	1-104-319-11	POLYSTYRENE 10000PF 10% 125V	
C256	1-125-582-11	ELECT 470uF 20% 63V (Germany)	
C257	1-104-319-11	POLYSTYRENE 10000PF 10% 125V	
C259	1-123-369-00	ELECT 4.7uF 20% 63V	
C302	1-104-233-00	POLYSTYRENE 220PF 10% 125V (Germany)	
C501	1-123-380-00	ELECT 1uF 20% 100V	
C502	1-136-157-00	FILM 0.022uF 5% 50V	
C503	1-126-163-11	ELECT 4.7uF 20% 50V	
C504	1-136-157-00	FILM 0.022uF 5% 50V	
C505	1-124-234-00	ELECT 22uF 20% 16V	

< DIODE >

D201	8-719-912-20	DIODE 1SS120	
D202	8-719-912-20	DIODE 1SS120	
D251	8-719-912-20	DIODE 1SS120	
D252	8-719-912-20	DIODE 1SS120	
D301	8-719-200-02	DIODE 10E-2	
D501	8-719-303-00	DIODE SEL2510C	
D502	8-719-301-38	DIODE SEL2210S-C	
D503	8-719-912-20	DIODE 1SS120	
D504	8-719-912-20	DIODE 1SS120	
D505	8-719-301-61	DIODE SEL2910A-D	
D506	8-719-301-61	DIODE SEL2910A-D	
D507	8-719-301-61	DIODE SEL2910A-D	
D508	8-719-301-61	DIODE SEL2910A-D	
D509	8-719-301-61	DIODE SEL2910A-D	
D510	8-719-301-61	DIODE SEL2910A-D	

< CONNECTOR >



EH3	* 1-564-505-11	PLUG, CONNECTOR 2P	
EH5	* 1-564-505-11	PLUG, CONNECTOR 2P	
EH6	* 1-564-505-11	PLUG, CONNECTOR 2P	
EH7	* 1-564-509-11	PLUG, CONNECTOR 6P	
EH8	* 1-564-505-11	PLUG, CONNECTOR 2P	
EH9	* 1-564-506-11	PLUG, CONNECTOR 3P	
EH11	* 1-564-505-11	PLUG, CONNECTOR 2P	

< COIL >

L301	* 1-428-071-11	COIL, AIR-CORE 0.7uH	
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< TRANSISTOR >

Q215	8-729-184-53	TRANSISTOR 2SC1845-EA	
Q216	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q265	8-729-184-53	TRANSISTOR 2SC1845-EA	
Q266	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q501	8-729-141-03	TRANSISTOR 2SA733-QP	
Q502	8-729-141-03	TRANSISTOR 2SA733-QP	
Q503	8-729-281-54	TRANSISTOR 2SC1815BL	
Q504	8-729-200-95	TRANSISTOR 2SJ74	

Note: The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

MAIN(B-R)

MAIN(B-L)

DRIVE

FUSE

SELECTOR

SP.TM

LED(L)

LED(R)

Ref. No.	Part No.	Description	Remark
< RESISTOR >			
R1	△ 1-259-671-11	CARBON 620 2% 1W	
R201	△ 1-219-010-11	FUSIBLE 33 5% 1/2W	
R202	△ 1-219-010-11	FUSIBLE 33 5% 1/2W	
R204	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R205	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R206	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R207	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R208	△ 1-219-079-11	FUSIBLE 47 5% 1W	
R209	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R210	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R211	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R212	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R213	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R214	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R215	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R216	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R217	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R218	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R219	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R220	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R221	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R222	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R223	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R224	1-219-038-11	FUSIBLE 470 5% 1/2W	
R225	1-247-713-11	CARBON 1K 5% 1/4W	
R226	1-247-713-11	CARBON 1K 5% 1/4W	
R227	1-249-460-11	CARBON 15K 5% 1/4W	
R228	1-249-460-11	CARBON 15K 5% 1/4W	
R229	1-249-460-11	CARBON 15K 5% 1/4W	
R230	1-249-460-11	CARBON 15K 5% 1/4W	
R231	1-247-721-11	CARBON 4.7K 5% 1/4W	
R232	1-249-497-11	CARBON 33K 5% 1/4W	
R233	1-249-661-11	CARBON 330 5% 1/2W	
R251	△ 1-219-010-11	FUSIBLE 33 5% 1/2W	
R252	△ 1-219-010-11	FUSIBLE 33 5% 1/2W	
R254	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R255	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R256	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R257	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R258	△ 1-219-079-11	FUSIBLE 47 5% 1W	
R259	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R260	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R261	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R262	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R263	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R264	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	

Ref. No.	Part No.	Description	Remark
R265	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R266	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R267	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R268	△ 1-217-997-11	FUSIBLE 10 5% 1/2W	
R269	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R270	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R271	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R272	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R273	1-219-117-11	RES. WIREWOUND (0.47±0.47 3W)	
R274	△ 1-219-038-11	FUSIBLE 470 5% 1/2W	
R275	1-247-713-11	CARBON 1K 5% 1/4W	
R276	1-247-713-11	CARBON 1K 5% 1/4W	
R277	1-249-460-11	CARBON 15K 5% 1/4W	
R278	1-249-460-11	CARBON 15K 5% 1/4W	
R279	1-249-460-11	CARBON 15K 5% 1/4W	
R280	1-249-460-11	CARBON 15K 5% 1/4W	
R281	1-247-721-11	CARBON 4.7K 5% 1/4W	
R282	1-249-497-11	CARBON 33K 5% 1/4W	
R283	1-249-661-11	CARBON 330 5% 1/2W	
R301	△ 1-259-749-11	CARBON 10 2% 2W	
R501	1-249-945-11	CARBON 8.2K 1% 1/4W	
R502	1-247-717-11	CARBON 2.2K 5% 1/4W	
R503	1-247-725-11	CARBON 10K 5% 1/4W	
R504	1-247-725-11	CARBON 10K 5% 1/4W	
R505	1-247-721-11	CARBON 4.7K 5% 1/4W	
R506	1-247-725-11	CARBON 10K 5% 1/4W	
R507	1-249-513-11	CARBON 24 5% 1/4W	
R508	1-247-721-11	CARBON 4.7K 5% 1/4W	
R509	1-246-545-00	CARBON 1.0M 5% 1/4W	
R510	1-247-703-11	CARBON 180 5% 1/4W	

< RELAY >

RY301	1-515-703-11	RELAY	
RY302	1-515-703-11	RELAY	
RY303	1-515-703-11	RELAY	

< SWITCH >

S101	1-572-074-11	SWITCH, ROTARY (INPUT SELECTOR)	
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< CONNECTOR >

VH1	1-564-320-00	PIN, CONNECTOR 2P	
VH2	1-564-320-00	PIN, CONNECTOR 2P	
VH8	* 1-564-241-00	PIN, CONNECTOR 4P	
VH9	* 1-564-243-00	PIN, CONNECTOR 6P	
VH10	* 1-564-104-00	PIN, CONNECTOR 3P	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
	* 1-633-170-11	IC BOARD *****	
		< IC >	
IC501	8-759-947-34	IC LM35DZ	

		MISCELLANEOUS *****	
174	1-533-185-11	HOLDER, FUSE (US)	
CNP1	△ 1-559-271-11	CORD, POWER (Germany)	
CNP1	△ 1-559-479-11	CORD, POWER (US)	
F1	△ 1-532-325-00	FUSE, TIME-LAG (6.3A) (Germany)	
F1	△ 1-532-510-00	FUSE, GLASS TUBE (8.0A) (US)	
J1	1-568-918-11	JACK, PIN 1P (UNBALANCED)	
J2	1-568-918-11	JACK, PIN 1P (HOT)	
J3	1-568-918-11	JACK, PIN 1P (COLD)	
J4	1-568-917-11	CONNECTOR, CANON (SOCKET) 3P (BALANCED)	
M501	1-520-507-11	METER	
S1	1-554-538-00	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)	
S201	1-576-080-11	THERMOSTAT	
S251	1-576-080-11	THERMOSTAT	
T1	1-424-299-11	TRANSFORMER, LINE	
T2	△ 1-450-490-11	TRANSFORMER, POWER (US)	
T2	△ 1-450-491-11	TRANSFORMER, POWER (Germany)	
TM301	1-537-248-11	TERMINAL BOARD (SPEAKER 2P)	

		ACCESSORIES & PACKING MATERIALS *****	
	3-703-450-01	INSTRUCTION (US)	
	3-751-053-11	MANUAL, INSTRUCTION (English, French, Spanish, Portuguese) (Germany)	
	3-751-053-21	MANUAL, INSTRUCTION (English) (US)	
	3-751-053-41	MANUAL, INSTRUCTION (German, Dutch, Swedish, Italian) (Germany)	
	4-362-304-00	GUARD, PLUG	
	* 4-935-245-01	CUSHION	
	* 4-945-283-01	INDIVIDUAL CARTON	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
HARDWARE LIST *****			
# 1	7-682-560-09	SCREW +B 4X6	
# 2	7-682-650-09	SCREW +PSW 3X12	
# 3	7-682-561-09	SCREW +B 4X8	
# 4	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
# 5	7-685-144-19	SCREW +P 3X5 TYPE2 NON-SLIT	
# 6	7-683-425-04	BOLT, HEXAGON SOCKET 4X20	
# 7	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S	
# 8	7-682-547-09	SCREW +B 3X6	
# 9	7-682-562-04	SCREW +B 4X10	
#10	7-624-105-04	STOP RING 2.3, TYPE -E	
#11	7-682-548-09	SCREW +B 3X8	
#12	7-682-147-15	SCREW, TR	
#13	7-682-552-04	SCREW +BVTT 3X16 (S)	
#14	7-682-148-15	SCREW, TR	
#15	7-682-149-15	SCREW, TR	
#16	7-682-248-09	SCREW +RK 3X8	
#17	7-682-566-09	SCREW +B 4X20	
#18	7-682-580-09	SCREW +B 5X25	
#19	7-682-551-09	SCREW +B 3X14	
#20	7-682-575-09	SCREW +B 5X10	
#21	7-682-569-09	SCREW +B 4X35	
#22	7-682-666-09	SCREW +PSW 4X20	
#23	7-682-581-09	SCREW +B 5X30	
#24	7-688-005-01	WASHER, PICTURE TUBE	
#25	7-688-004-02	W 4, SMALL	
#26	7-682-577-09	SCREW +B 5X14	
#27	7-684-024-04	N 4, TYPE 2	
#28	7-623-210-22	SW 4, TYPE 2	